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DIESEL

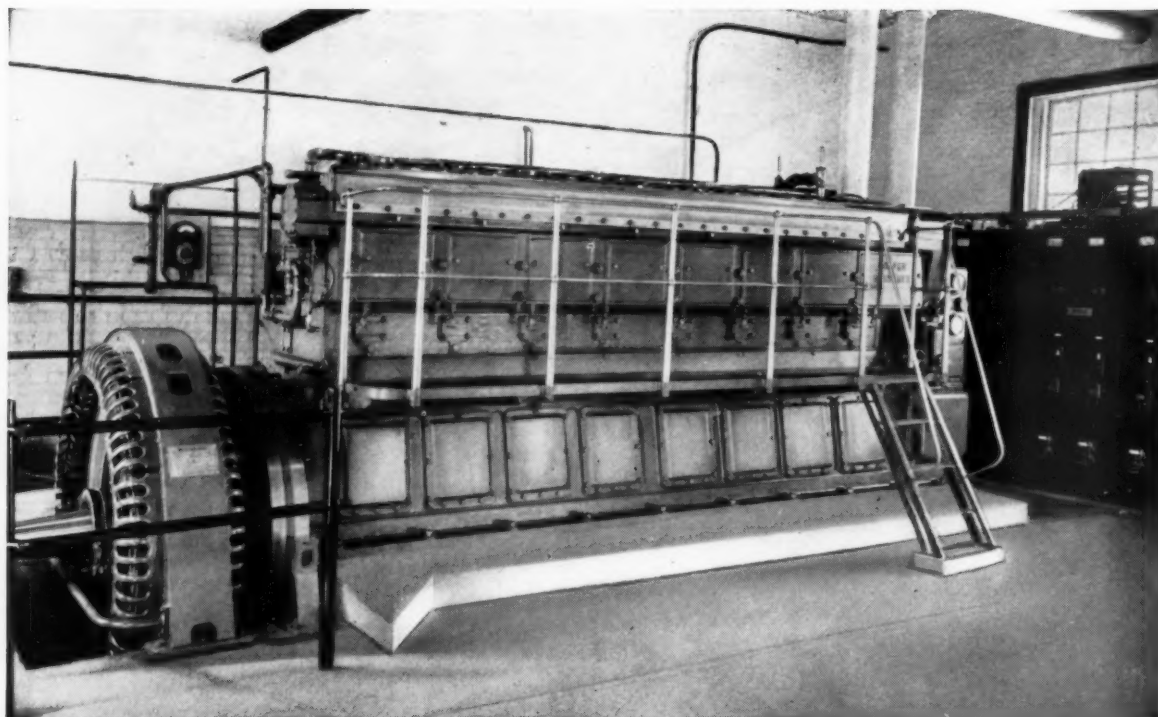
PROGRESS

IN INDUSTRY ★ IN TRANSPORTATION ★ ON THE SEA ★ IN THE AIR

SEPTEMBER 1946



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DIESEL *and* GAS ENGINE PROGRESS

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DIESEL PROGRESS for September, 1946, Vol. XII, No. 9. Published monthly by Diesel Engines, Inc., 2 West 45th Street, New York 19, N. Y. Tel. MUrray-Hill 2-7333. Subscription rates are \$5.00 for U.S.A. and possessions. All other countries \$7.50 per year. Subscriptions may be paid the London office at £1-17s per year.

Member National Business Papers Association and
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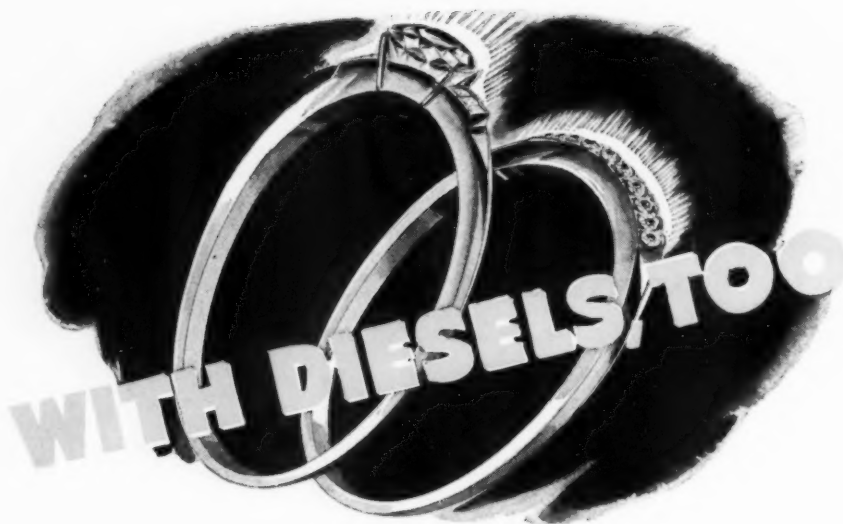
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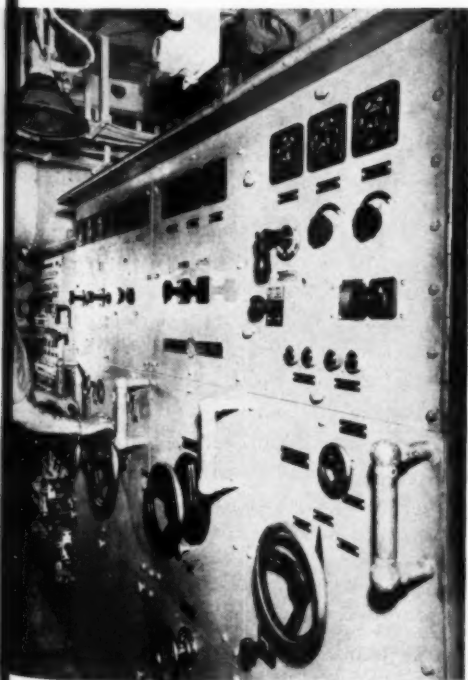
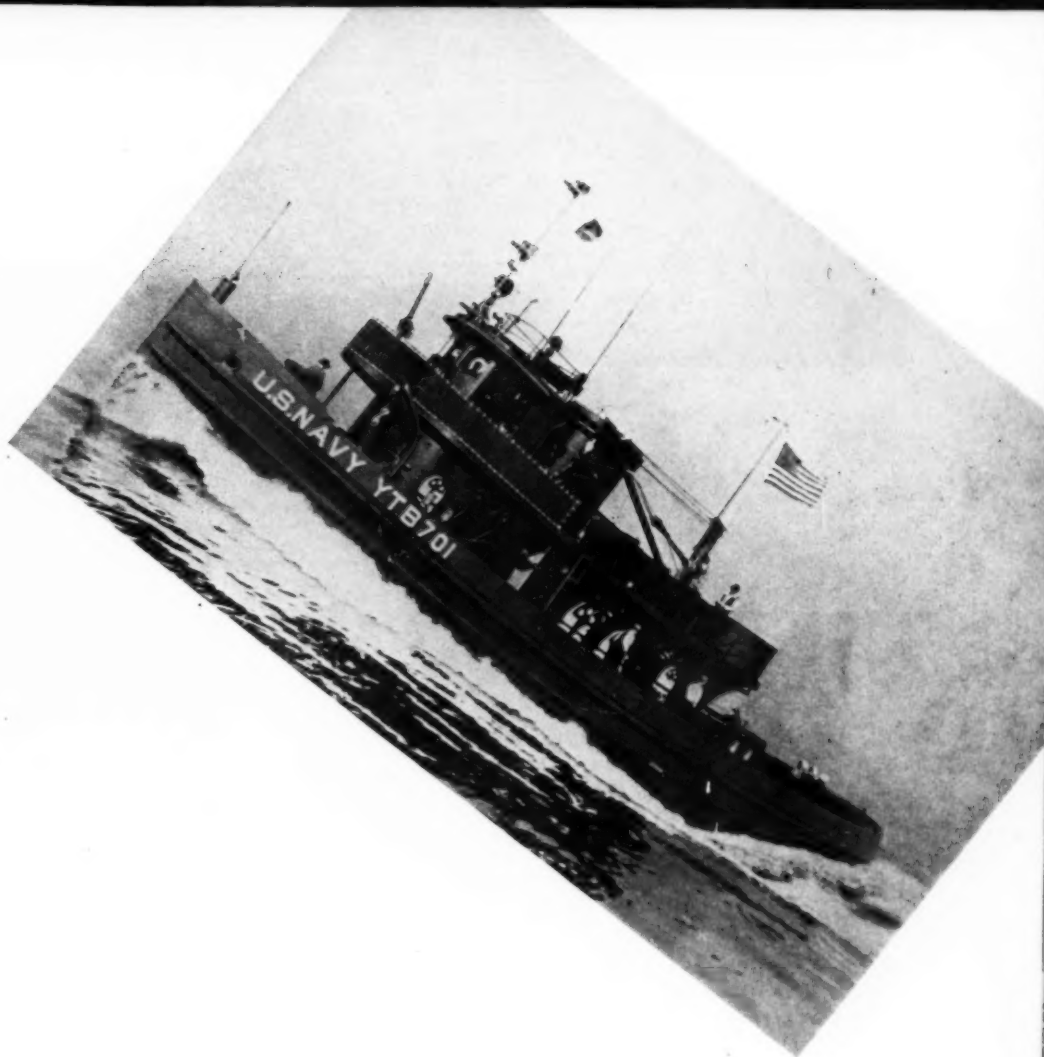
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SHELL DIESEL FUELS AND LUBRICANTS



One of the 100-foot Navy tugs doing a speed of 12.5 knots without tow. It has a cruising range of 3000 miles at a speed of eight knots.

NEW DIESEL TUGS FOR NAVY



The main control panel of the "YTB 701" showing controls for generators, exciters and motors.

FOUR new Diesel-electric harbor tugboats, powered by General Motors Diesel engines, have completed their sea trials and been assigned to the 11th Naval District. These boats were built in the San Pedro yard of the Bethlehem Steel Company, Shipbuilding Division, Terminal Island.

The vessels are designed primarily for harbor and channel service, but have power and seaworthiness for coastal operation. With all-steel, all-welded hulls, 100-foot over-all length and 25-foot beam, these tugs are of the YTB 701-704 series. Top speed without tow is 12.5 knots; cruising range is 3000 miles at maximum economical cruising of eight knots. Full engine power is available over a propeller speed range of 127 to 170 rpm.

The vessel is equipped with two 480 hp. General Motors Diesels, with a rated continuous rpm. of 720. Each develops an overload hp. of 650 at a rpm. of 800. They are 2 cycle, with a bore of $8\frac{3}{4}$ in. and a stroke of $10\frac{1}{2}$ in.

The electrical equipment on the tugs includes two d-c propulsion generators, two d-c main exciters (auxiliary generators), two d-c generator-excitors, two d-c propulsion motors, and

control equipment. Control equipment consists of one engineroom control for generators, exciters, and speed and direction of rotation of propulsion motors, two pilothouse pedestals and instrument panels for controlling electric drive from the pilothouse; and two selsyn receivers for engine speed control.

The propulsion generators, each rated 410 kw., 1640 amp., 250 volts, 800 rpm., are separately excited by 3-kw. exciters. Totally enclosed and Diesel-engine driven, each generator is equipped with one surface air cooler and two 2-hp., 2000-rpm., 250-volt fan motors. The propulsion motors are each rated 515 hp., 1640 amp., 250 volt, 895/1200 rpm., and are connected to the same propeller shaft through a 7:1 reduction gear. Separately excited from excitation bus, each motor is equipped with one surface air cooler and two $1\frac{1}{2}$ -hp., 1850-rpm., 250-volt fan motors.

Former tugs of this type had generators and main propulsion motors cooled by fans mounted directly on the armatures. These four new tugs use water-cooled heat exchangers for temperature control of propulsion generators and motors. The heat exchangers are assisted in ventilation by means of motor-driven fans in the air ducts.

"THE CHIEF" GOES DIESEL

By CHARLES F. A. MANN

"ON The Atchison, Topeka & Santa Fe"—goes the amazing tune that was supposed to sweep the country in 1945 and die promptly, as all other song hits do . . . but the tune still goes merrily on and becomes one more part of the amazing psychological grip that amazing Western Railroad system has on the mass of U. S. travellers.

The song never stops nor does that enterprising System ever run out of schemes to improve its service dramatically.

June 2nd, was "R" Day in the whole vast West, as far as railroads were concerned, for on that day the Big Boys in the western railroad game let out the throttle on practically every Transcontinental schedule, and with a few weeks head start on the new transcontinental sleeper service, had this business smoothed out to a daily through operation between the East Coast and the West Coast for the first time in this century.

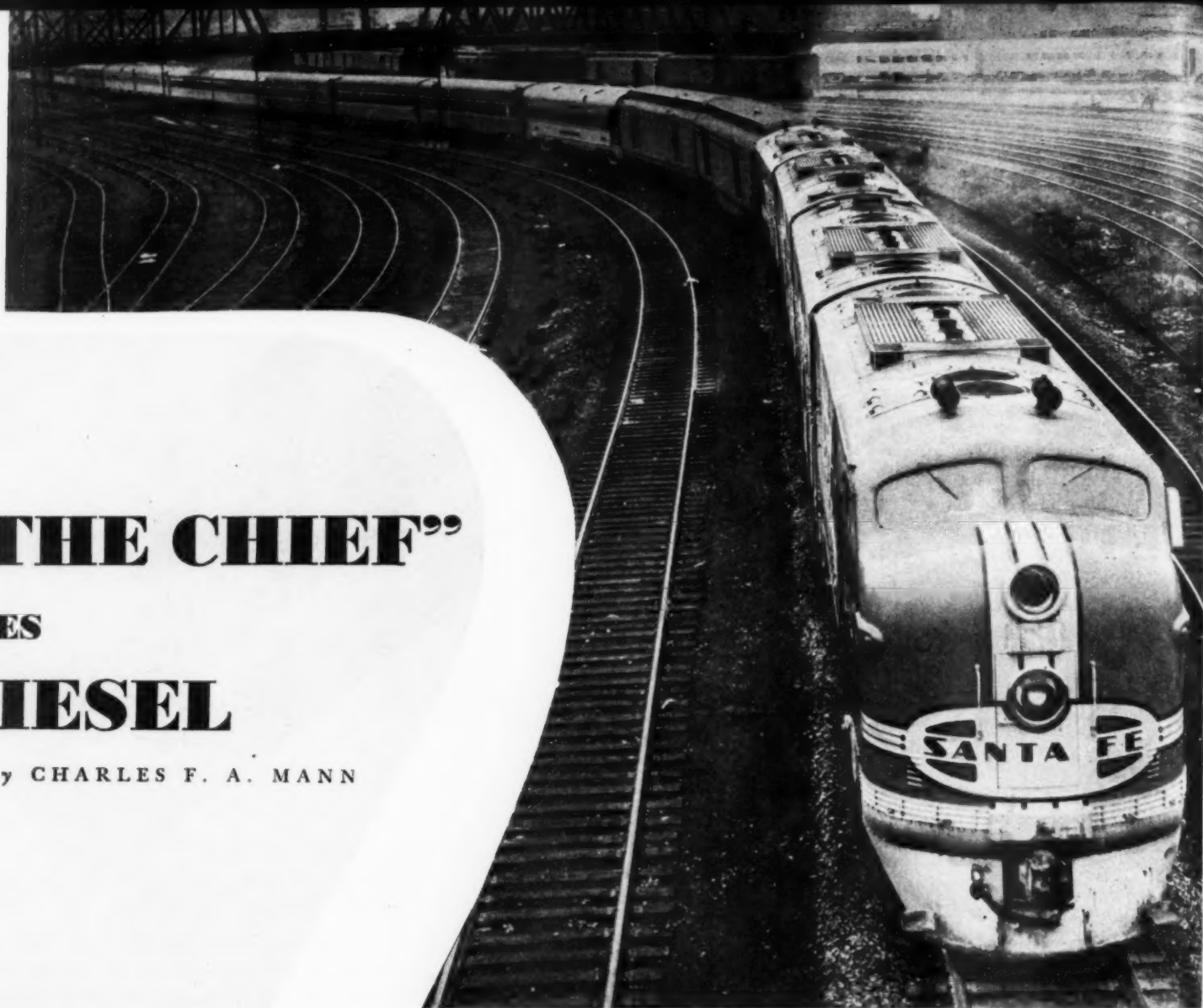
The traveller, on "R" Reconversion) Day, not only got a big break in speedier schedules, but the Diesel industry added one more "first" to its trophy case, and the Santa Fe departed from one more tradition to keep step with the racing pace of postwar travel.

Firstly, America's best known Western train, "The Chief," one of the 5 outstanding trains in the world, cut down the daily schedules to practically 48 hour westbound and 47 hours eastbound. Secondly, the Motive Power Department of the Santa Fe, scarcely five years from the time everybody was *dead certain* that "The Chief" would continue for the next 20 years as a steam train, began operation as a Diesel train for its whole run from Chicago to Los Angeles! Thirdly, to the Santa Fe goes credit for bringing out the first All-Purpose Diesel locomotive, for transcontinental use in that the Chief was hauled by a good old reliable 5400 hp. General Motors freight Diesel, out of that remarkable fleet of some 80 almost

identical 5400's operated by the Santa Fe, geared for 98 miles per hour speed, and equipped with two heating boilers and standard passenger train controls.

Readers of this publication will recall our forecast nearly a year ago that if any railroad ever had its Foresight and Idea Department working, the Santa Fe was it, for the simple reason that in acquiring its vast fleet of Freight Diesels, to help polish off the war load, it was simultaneously acquiring not only a huge fleet of swift, powerful freight haulers, but it was also stockpiling a magnificent fleet of Road Passenger locomotives that could, with nominal changes in gearing, etc., be quickly converted to high speed Diesel passenger power very quickly.

So, on June 2nd, while the Santa Fe was still crowded for lack of new lightweight passenger equipment, it stood out alone as the best equipped and biggest Diesel or Steam railroad



The CHIEF moves west out of the Chicago yards on June 2, 1946 with Santa Fe's big 5400 hp. D-160 Diesel locomotive out in front. The CHIEF is now Dieselized.

Early lunch guests in the CHIEF's diner on the first Diesel run on June 2, 1946.



Santa Fe CHIEF's observation car points up the comfort of modern rail travel.



W. Coules adjusts the steam pressure of a heating boiler in one of the locomotive units. They are Vapor Clarkson boilers.



Engineer Charles Paul (sitting) and fireman O. R. Beers study a new time card in the cab of No. 160, before they leave Chicago.

in the world, from the standpoint of motive power, for the speed era.

Also, when the big No. 160 5400 GM Diesel pulled out of Chicago on June 2, the first transcontinental run of an All-Purpose Diesel, a Diesel that probably "busted her sides" yanking 3500 ton wartime freights over the Arizona-New Mexico plateau, she now became a lady with a beautiful, lightweight "Name" train for company, blazing the trail for better, cheaper, more flexible and more efficient utilization of motive power for the Railroads of Tomorrow.

The Santa Fe now has about \$45,000,000 invested in one class of motive power—some 80 5400's—probably the largest fleet of one single type of motive power ever owned by any single railroad. The handwriting is on the wall for railroad operators with 40 or 50 types of locomotives which are of highly specialized design and which, experience has proved, soon are outdated and listed as losing propositions.

It is refreshing to observe that the Santa Fe leads the entire U. S. Railroad industry in the general direction of a One-Pow, One Speed, One Class (and that Class is DeLuxe for both freight and passenger) Railroad that can engage in mass transportation at a profit, even if competition forces rates down to the bone.

So, when Diesel No. 160 left Chicago June

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2nd, with the proud Chief in tow, another bit of world railroad history was made and another forward step in railroad motive power was achieved, and the happy customers got the benefits of a swift, smooth, clean ride, at medium-high sustained speeds, sans those terrific bursts in the vicinity of 120 miles per hour. And the once proud streamlined Santa Fe Steamers gave way to the new age of Railroad Motive Power, despite the fact that they had 15 or 20 years of useful life ahead of them. A beautiful case of refined, polite and polished obsolescence, if there ever was one. Remember, when they came out 9 years ago? Who would have dreamed their day would end so soon???

The Diesel Chief leaves Chicago at noon and arrives in Los Angeles at 10 A.M. 48 hours later. Eastbound, from Los Angeles at noon and Chicago at 1 P.M., 47 hours later. Normally, the consist is 15 cars to Kansas City, 14 beyond Ash Fork Westbound. Eastbound the consist is the same in reverse order. Transcontinental sleepers originating in New York on both the "Pennsy" and "Central" and from Washington, D. C., from the B & O—3 sleepers—are operated daily. Every car except 3 mail cars is lightweight roller bearing type, which results in a train of about 1100 or 1200 tons. and permits operation of the big EMD-GM Diesel clear through with no helper, except on three of the stiffest grades, and this only to make

scheduled time. Again, the efficiency and tighter economies of better car utilization show up in this operation. Normally sleepers from New York and Washington tie up in Chicago all day. Now they lose but two or three hours of motion, and are off again westward. More sleeping car passenger miles per car, from the same sum total of the equipment pool necessary to maintain the improved service.

The question arises: Why didn't the railroads think of this 25 years ago?

Engine crew stops are made at Shopton, Iowa; Kansas City, Newton and Dodge City, Kansas; La Junta, Colorado; Raton, Las Vegas, Albuquerque, and Gallup, New Mexico; Winslow and Seligman, Arizona; Needles and Barstow, California. Fuel and boiler water stops are made at: Shopton, Newton, La Junta, Albuquerque, Winslow and Los Angeles.

One thing is interesting from a technical viewpoint and that is the probable nice usage made of the husky, very flexible dynamic (regenerative) brake on the big Diesels. Because of the speed of this operation, and the long grades on the Santa Fe, practical use can be made of the electric brake for hundreds of miles—even on slow-downs in flat country. Many of the long, smooth Santa Fe grades can be negotiated in their entirety by light, continuous touches . . . And now please turn to page 81 . . .



Standing (left to right) in front of the big Diesel are Charles Paul, Engineer; O. R. Beers, Fireman; Lee Price, Master Mechanic; and Charles Schneider, Roundhouse Foreman.

Left side of the 5400 hp. Diesel-electric locomotive No. 160 which was built by the Electro-Motive Division of General Motors. During the war this engine was used for freight hauling; now with minor changes it hauls the Santa Fe CHIEF at a maximum speed of 98 mph.



SOUTHERN TRUCKERS SWING TO DIESELS

By BRUCE C. SISSON

IN the rolling country of North Carolina's Piedmont region amid the newly industrialized cities and towns of that section there is sort of a revolution going on which should make the Diesel-proud Western truck operators look to their laurels. Southern truckers are swinging to Diesel tractors as fast as they become available. The trucking industry of the South-East has grown greatly in recent years and by the added impetus of wartime demands has become the most important transportation industry. While the railroads still carry basic raw material such as coal, steel and lumber, the truckers carry the bulk of the South's merchandise, garden products, and textiles to northern cities.

A recent visit to High Point, North Carolina, and other towns within a 75 mile radius along with interviews with the various operators disclosed some interesting facts about the southern trucking industry. Up until 1939 Diesel operation was practically unknown in the South. Outside of a few independent operators the possibilities of Diesel economy went by the board. However, with the advent of the war and the need for more power for heavier loads the Diesel began to show more and more. And where it did show so did amazing fuel economies and greater payloads.

The Cummins Company pioneered this Diesel expansion through its sales and service office at High Point, and its able representative, Guy Wood, with his trained staff of Diesel mechanics.

With characteristic caution, truckers accepted the tales of Diesel economy and pulling power with several grains of salt. They wanted proof and that is what their first Diesels gave them.

By giving the available Diesels the widest distribution possible, and by making sure that Diesel-conscious operators had at least one Diesel, the High Point agency was ready to let Diesel operation prove itself. When truckers began to compare the costs of Diesel and gas operation, the Diesel's case was won. They found that Diesel fuel was less expensive than gasoline. They discovered that the Diesel would operate at a cost of one cent a mile less than a gas engine, that the Diesel would average two more miles per gallon of fuel and that they could count on heavier loads and still cut down their running time considerably. They found that their drivers, once accustomed to driving a Diesel tractor, didn't like to go back to driving gasoline jobs, and who should tell a driver what he likes or doesn't like.

The most enthusiastic Diesel converts are those drivers who own their own trucks. They can view their operation both as owner and driver.

Pete Wilkes of High Point owns a new Mack tractor with a 200 hp. Diesel installed. We contacted him as he was about to leave for Chicago with a load. We inspected the big tractor and Pete proudly showed us his new cab radio and powerful air horn. He drives for Roadway out of High Point and does most of his hauling over the Alleghenies to Chicago and Detroit, a run over some of the toughest mountain country in the United States. Comparing his Diesel's performance to that of a gas truck, he says that on the 300 mile pull over the mountains the Diesel will save anywhere from 3 to 5 hours.

On the steep grades where a gas truck will chug along at 2 and 3 miles an hour, his Diesel will do 10 and 11 with a much heavier load.

Most of the southern operators are standardizing on three makes of tractors for their Diesel operations—Mack, Autocar, and Corbitt. All three types are readily adaptable to Diesel drive with only slight modifications. However, different transmission and drive ratios are required for Diesel tractors because of the relatively

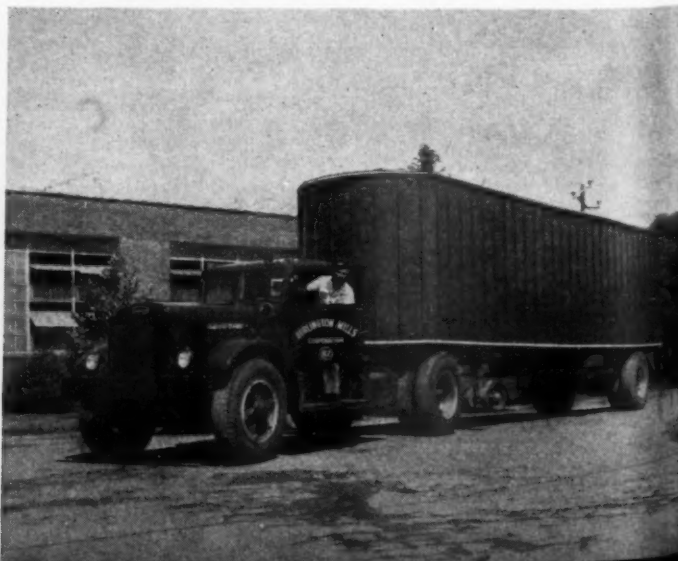
MAINTENANCE TIME CUT WITH DIESELS

(Below) The Central Motor Lines of Kannapolis, N. C., haul the textile products of the world-famous Cannon Mills. This company has 66 tractors which operate 450,000 miles per month. However, the 10 Diesel tractors which the company operates account for well over one-third of the total monthly mileage. Mr. Thrasher, maintenance superintendent of the company, says Diesels are easier to maintain than gas powered trucks and usually take an hour less time during maintenance periods. The company now has 25 Corbitt Tractors equipped with Diesel engines on order. In picture below Mr. Thrasher (left) and C. A. Buxton, Cummins Regional Manager, pose with one of the big Corbitts.



WORLD'S LARGEST RAYON WEAVING COMPANY UTILIZES DIESEL TRUCKS

With a total of 70 tractor trailer units, including 5 Diesel tractors, the Burlington Mills hauls its own textiles between Cumberland, Md., and Burlington, N. C., a trip of 375 miles over mountains. On a round trip Diesels save four to five hours over the gas tractors. The company estimates that Diesels average 150,000 miles per year as against half that figure for the average gas truck. Photograph below shows one of four Autocar tractors equipped with 150 hp. Cummins Diesels. This tractor averaged 5.68 miles per gallon of fuel and at a cost of 2.85¢ per mile.



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ONE OF THE LARGEST TRUCKING COMPANIES IN THE WORLD USES DIESELS

One of the largest trucking companies in the world, the North Carolina Contracting Company, has 300 trucks in its fleet. L.J.T. M. tractor h driver J. Diesels. outfit tha York. Th ment in

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slower engine speed of the Diesel. The most common transmission used is the five speed type in which the gearing is split to give a total of 10 forward speeds.

Two companies which are not included in the group of illustrations on this and following pages, deserve mention. They are the McClean Trucking Company and the Quality Oil Transport Company. Mr. McClean, owner of the former company, now has 13 150 hp. Macks which are Diesel driven. Jim Early, his Maintenance Superintendent, is well pleased with the service they have given on the company's Atlantic coast runs.

The Quality Oil Transport Company of Winston-Salem delivers oil throughout the state. The company is an old timer as far as Diesels go. James Glynn, part owner of the concern, told us of his 4 Diesel tractors which are used to haul the company's tank trailers and which do a job that couldn't be done with gas-powered tractors.

In order to cover this important development in southern trucking more fully and to present a rounded picture of the amazing progress which has been made in Diesel transport, the next five pages are presented in illustrations and captions which picture and describe some of the Diesel operations. The installations pictured are all Cummins.

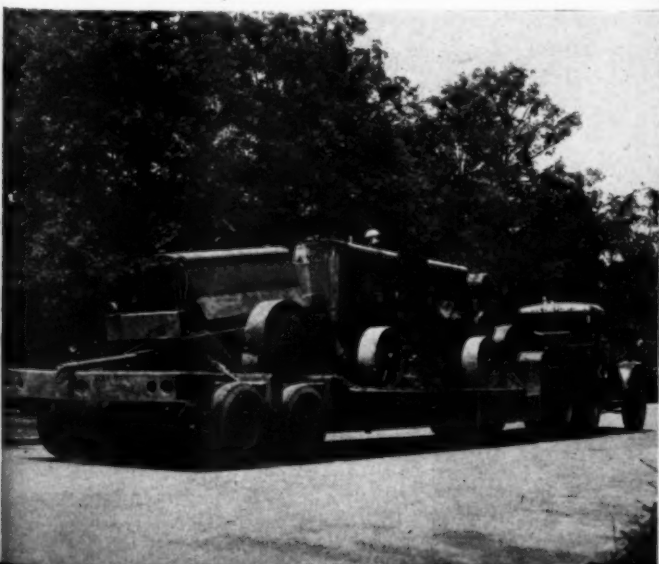
ONE OF NORTH CAROLINA'S LARGEST CONTRACTING FIRM USES DIESEL

One of the two largest contracting outfits in North Carolina is the Central Engineering & Contracting Corporation, Durham, N. C. Owners of 30 Diesels, the company has 9 more on order. The illustrations below, right, show a L.J.T. Mack with a 60 ton trailer load. This tractor has 90,000 miles on its record and its driver John Peed (seen in cab) swears by Diesels. He drove the first straight trailer outfit that ran out of North Carolina for New York. The concern bought its first Diesel equipment in 1939.



DIESELS SAVE EIGHT HOURS ON 1,160 MILE ROUND TRIP

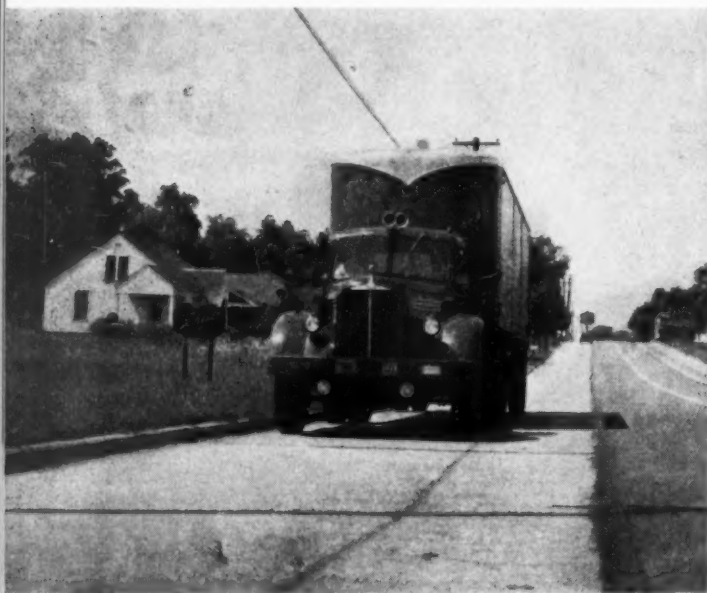
The Slater Manufacturing Company operate 12 tractors, 4 of these are Diesels. These trucks operate between Greensboro, N. C., and Meadville, Pa., on one of the toughest mountain runs in the East. 80 per cent of this 580 mile run is through mountains. On this run the Diesels average eight hours per trip better than the lighter loaded gas tractors. The upper picture shows driver V. B. Kearns standing on the running board of his Mack, which he has driven since its original purchase. Picture at right shows overall view of the Cummins powered Mack.





DIESEL DOES THE WORK OF 4 GAS TRUCKS

(Above) This 12-yd. Euclid is one of the Diesels working for the Grove Stone & Sand Company of Swannanoa, N. C. They have speeded up work considerably since their acquisition last November. So efficient have the Diesels proved that they are being used for two 10 hour shifts every day, while the gas powered trucks work a single shift. A Diesel working 20 hours uses less fuel than a gas engine truck working 10 hours, besides carrying one-third more load. The company's Mack End Dump Truck is doing the work of 4 gas engine trucks and the figures show it. On a 106 mile trip the Mack, which is equipped with a Cummins Diesel, used up 16 gallons of fuel at a cost of approximately one cent a mile. It was delivering a load that 3 gas trucks would ordinarily carry at a cost of two cents a mile apiece.



AKERS MOTOR LINES

(Left) Akers Motor Lines of Gastonia, N. C., lease several Diesel trucks for their runs northward. Jack Haynes, driver of one of these leased Diesel trucks, reports that he drove from Boston, Mass., to Gastonia, a trip of 900 miles in 29 hours. He also said that his Diesel averages 6.5 miles per gallon. He compares this figure to his previous gasoline job which averaged 3½ to 4 miles per gallon. On the north-bound run Akers carries textiles to the northern market and on the return trip the concern hauls general freight. The Diesel seen at left is owned by U. J. Parham and driven for Akers by Jack Haynes.



DIESEL SAVES 30 MINUTES RUNNING TIME EVERY 100 MILES

The Pomona Terra Cotta Company of Pomona, N. C., manufacturers of clay products, operate 20 trucks, most of these being small yard vehicles. They have a 150 hp. Diesel tractor which is used for hauls up to 300 miles. W. C. Boren, 3rd, owner of the company, has kept accurate cost figures comparing his gas and Diesel trucks. He found that the cost of Diesel operation was 2.5 cents per mile as against 3.8 cents per mile for the gas truck, and at the same time the Diesel truck carried more weight and made better time. The picture below shows the company's 150 hp. Diesel tractor.



SOUTHERN OIL TRANSPORTATION REPORTS LOW DIESEL MAINTENANCE COST

R. C. Floyd, shop superintendent of the Southern Oil Transportation at Greensboro, N. C., maintains a fleet of 20 Diesel engine tractors hauling oil and gasoline between Wilmington, Del., and North Carolina. He has developed an accurate card system for a daily service record of each tractor. His trucks average 150,000 miles per year and as yet have had no major overhaul. He cites one instance of an old Diesel engine Federal tractor which came in for overhaul with 270,000 miles on her record. New liners and new rings were installed with the same pistons that she had when new. The records show less than .002 cents per mile for cost of repair and maintenance on the present equipment. Below is picture of R. C. Floyd (center) explaining operation to Guy Wood, Cummins representative (left).



FISH DELIVERED BY DIESELS

(Above) Thomas W. Carroll of Charleston, S. C., owns 4 Mack trucks with Diesel engines and one Diesel Autocar. Each Mack has over 500,000 miles on it. He buys fish from Gloucester, Maine, to Florida, and supplies the Carolinas. His fuel record averages 8.5 and 9 miles per gallon when hauling a 12 ton pay load. On one trip made after an overhaul an average of 11 miles per gallon was made. George Meisters, shop superintendent, cares for his Diesels well, a major overhaul every 100,000 to 150,000 miles and with an oil change every 1,500 miles. Meister's statement on Diesel operation is very interesting, "We are hauling twice the pay load of a gas job for half as much." The picture above shows the newest addition to Carroll's Diesel fleet, an Autocar.

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PRIVATE OWNER C. R. FREEMAN CITES DIESEL FUEL SAVINGS OVER GASOLINE TRACTORS

C. R. Freeman of High Point, N. C., owns 3 tractors all powered by 200 hp. Diesel engines. He leases these to the Great Southern Trucking Company of Jacksonville, Fla., and hauls from High Point, N. C., to Atlanta, Ga., and points south. Freeman formerly owned Autocar gas powered tractors and says that he now gets 4 to 5 more miles per gallon of fuel with his Diesel tractors. A typical run from High Point to Atlanta, 690 miles round trip, costs him \$15.00 for Diesel fuel compared to \$13.00 for gasoline. Pictured below is one of Freeman's Autocars.



TEXTILE MOTOR FREIGHT

J. C. McIntyre owns 3 Diesel tractors at present and has sold all of his gas powered equipment. This company follows the general rule for tractors in the area, hauling textiles north and general commodities south. According to McIntyre, Diesels operate cheaper, faster and carry heavier loads. As far as maintenance goes, Mr. McIntyre says he likes Diesels because they don't give him any valve trouble. He also says that he can make 3 Diesels do the work of 8 gasoline engine trucks. As far as speed goes, he says he can make a trip to Amsterdam, N. Y., and back, some 1,562 miles, in 48 hours, whereas 30 hours one way was good time for a gas job.

FILM AND NEWSPAPER DELIVERY BY DIESEL

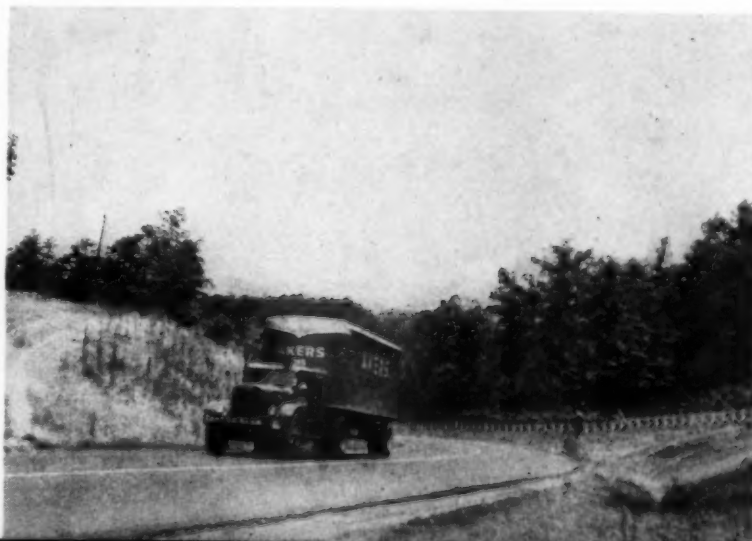
The Carolina Delivery Service of Charlotte, North Carolina, hauls most of their freight on a guaranteed delivery basis. They deliver movie film as well as newspapers throughout eastern North Carolina on a strict schedule basis. They have four Corbitt tractors equipped with 150 hp. Cummins Diesels. Mr. Vickers, owner of the company, decided on Diesel after long study for both its economy and its dependability. Fuel economy has been proved. In April and May of this year the four Diesel units averaged 7.06 miles per gallon. Running time between Charlotte and Raleigh and return, a distance of 375 miles has been cut 30 minutes with no increase in top speed. At right is seen one of Mr. Vickers' Corbitt tractors.



(Below) View of Junius Haywood's Autocar tractor pulling up a grade outside of Gastonia with a heavy payload. Diesels like this one can haul up to ten tons more than the gas tractors and still make much better time. Since last fall this tractor has traveled 66,000 miles. Haywood is one of the hardest working truckers to be found.

OPERATOR WANTS MORE DIESELS

Junius Haywood (seen above), lease operator for Akers Motor Lines, purchased an Autocar tractor in the fall of 1945. To date it has travelled 66,000 miles. Haywood on the run from Kings Mountain to Washington, D. C., a 300 mile trip, uses 64 gallons of Diesel fuel. The same trip with his former gasoline powered truck averaged 99 gallons of gasoline, carrying some 7,000 lbs. less weight. On the run from Gastonia, N. C., to New York, they leave at 8 A.M. Sunday and arrive in New York City at 4 P.M. They are able to unload and be ready to leave by the time the gasoline powered trucks arrive which left Gastonia 8 hours ahead of them.

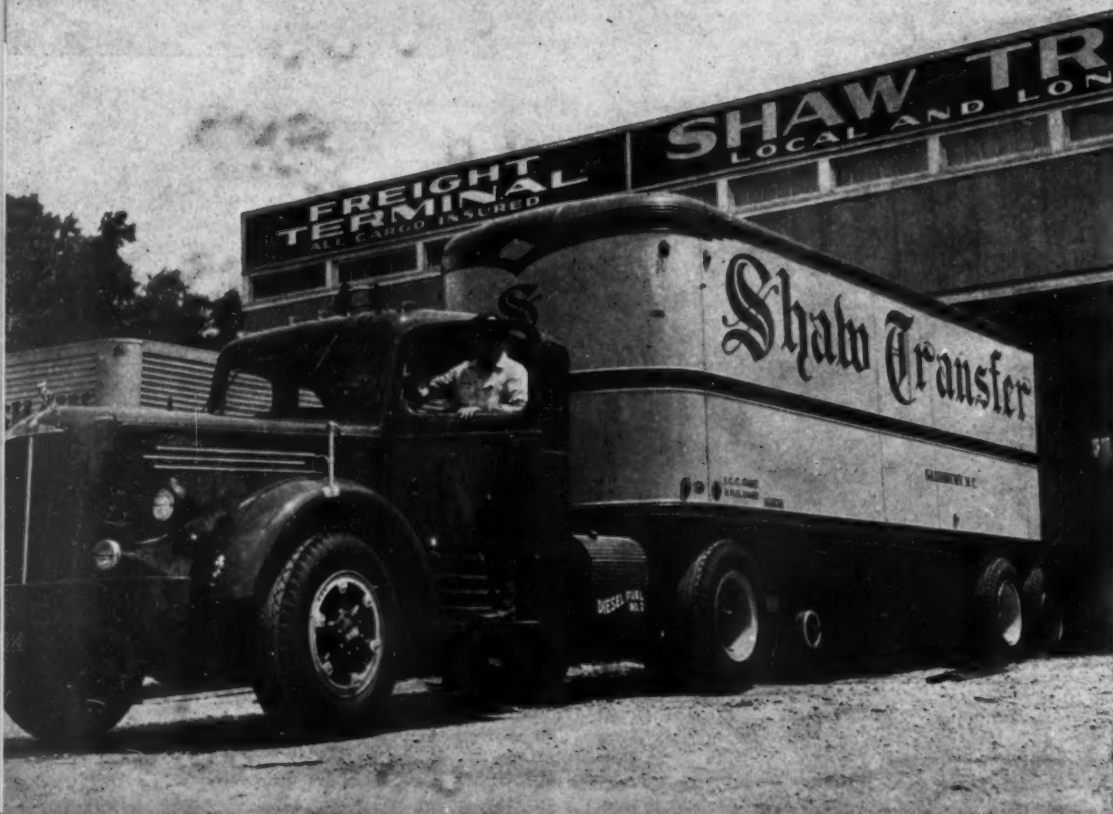


THE SHAW BOYS LIKE DIESEL

(Below) Elmer Shaw poses with his brand new Diesel-engined Mack. The Shaw family are all truckers, operating under their father's franchise. The five sons drive their own trucks. All the boys are envious of Elmer Shaw's new Mack tractor with its 200 hp. Diesel. As a matter of fact, his brothers are anxious to drive Diesels themselves. Elmer likes to talk about his Diesel experiences. He tells about passing seven trucks on a long hill coming out of Alexandria, Va. on one of his runs between Salisbury and New York City. Elmer owns a gasoline tractor as well as the Diesel. On a recent run to Washington, a distance of 380 miles, Elmer compared the fuel consumption of the two. The Diesel used 35 gallons of fuel. The gas tractor used 108 gallons.

DIESELS SAVE SIX HOURS ON 1,120 MILE TRIP

The S. and W. Motor Line, located in High Point, North Carolina, operate 12 tractors and 14 trailers. Two of these tractors are Autocars with 200 hp. Diesels. The company hauls rayon and cotton piece goods north and returns with a light payload of 10,000 to 12,000 lbs. consisting of empty spools and cones. The normal run is to Meadville, Pa., which makes a 1,120 mile round trip. The Diesels average 6 hours less time than the gas tractors and at the same time average $5\frac{1}{2}$ to 6 mpg. of fuel. The gas tractors get 4 to $4\frac{1}{2}$ miles per gallon.



THE MILLION MILE DIESEL TRACTOR

"Red" Setzer has been driving Diesels for seven years. He was driving Bill Shiltz's big Sterling when she turned in her millionth mile. "The Big 'Un," as the Cummins powered tractor was called, ran 800,000 miles on her first crankshaft. "Red" was sold on Diesels from that time on. Now, an independent produce buyer and hauler, Setzer owns his own 200 hp. Diesel Autocar. With his refrigerated trailer in tow he hauls from Florida to New York, Texas and Chicago, in fact as he says "anywhere they need the produce." The Diesel averages 7 to $7\frac{1}{2}$ miles per gallon on the Florida-New York run and it covers the 1,235 mile run in 35 hours. Even when running empty Setzer claims the Diesel is cheaper to operate. Below is seen Setzer's 200 hp. Autocar with refrigerated trailer.



DIESEL OPERATION SAVES 6 HOURS ON CHICAGO RUN

(Above) J. B. Surratt owns his LJT Mack with its 150 hp. Diesel. He leases his services to Turner's Transfer of Greensboro, North Carolina, for the run to Chicago. The 850 mile run takes him 20 to 21 hours driving time, six or seven hours faster than formerly with a gas truck. With a 40,000 pound payload the Diesel gets 6 miles per gallon of fuel. Surratt has put 46,000 miles on the tractor and has yet to pay any maintenance costs.

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DIESEL HAULS TWICE THE LOAD AND STILL SAVES A PENNY A MILE

W. J. W. Ferguson is another one of the private owners who leases his equipment to a trucking concern. Ferguson drives his tractor, a Mack equipped with a 150 hp. Diesel for the Cooper Motor Lines of Greenville, South Carolina. His regular haul is from Greenville to New York City, 723 miles. With his former gasoline tractor Ferguson could haul a 20,000 payload at a cost of 4c a mile. Now with the Diesel his fuel cost per mile is 3c, moreover he can haul loads up to twice those formerly carried. He has put 60,000 miles on the Diesel and his only maintenance cost has been on set of fan belts.



DIESELS HAUL UP TO 60 TONS

The Moss Trucking Company of Charlotte, N. C., specializes in heavy hauling. The illustration above shows a Fairbanks-Morse Diesel engine loaded on a trailer ready to go—weight 38 tons. According to J. A. Worley, General Manager of the concern, this load could be hauled at 7 to 9 miles per gallon of fuel. Recently a haul was made from Charlotte to Lake Harbor, Florida, a distance of 760 miles. Two trucks made the trip. A 150 hp. Diesel hauled 86,000 lbs. and the gas powered companion tractor 20,000 lbs. When fuel costs were figured, it was found that the gasoline costs for the trip were twice those of the Diesel fuel.

ALABAMA FREIGHTERS USE DIESEL

The Malone Freight Lines of Birmingham, Alabama, operate nine Diesel tractors on their run from Birmingham to New York City for an 1,100 mile run. Drivers Owen and Anderson estimate that they get 6 miles per gallon of fuel as against 3 miles per gallon with gas. Both drivers estimate a saving of 20 hours for the round trip to New York and return. Picture above shows driver Bill Anderson in the cab of his Diesel tractor.



DIESEL BEST AFTER TEST

The Thurston Motor Lines Inc. of Wilson, North Carolina, do most of their hauling within the state borders. Although the Wilson terminal is only one of seven which Thurston operates, it alone controls the operations of approximately 25 tractors. In January 1946, Thurston bought his first five Diesels installed in Corbett tractors. This was done only after Thurston himself put the Diesels to the test against his best gas engined tractor. It was during these tests that the Diesel proved that it could operate at 1 1/4c per mile cheaper than the best gasoline tractor carrying lighter loads. On short hauls under 200 miles Thurston's Diesels get approximately 6 miles per gallon. On longer hauls the Diesels averaged 8 miles per gallon as against 5 mpg. for the gasoline engined tractors.



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AMONG the interesting features of a yacht now being built for Cyrus McCormick of International Harvester fame at the Julius Peterson yard, Nyack, N. Y., is the attempt to build a power houseboat having an exterior simulating that of lighter cruisers of her length. Because of the excellent job of proportion which John

H. Wells has done, this craft may look lower than she really is, when there is no other object close by for comparison. The extra freeboard of about six inches which this vessel will have is due to the height of Mr. McCormick, who is 6-ft. 5-in. and needs plenty of headroom below deck. His yacht is having

another unusual feature, namely, a four-poster bed in the owner's personal stateroom.

Mr. McCormick, who will use the *Nambay*, as she will be named, for cruising mainly in Eastern U. S. waters, has shown very considerable attention to the details of her design.

Architect's view of the new McCormick yacht "Nambay." She will be 87 feet overall with a beam of 19½ feet. Her cruising speed will be in excess of 12 knots.



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Under his direction, the plans have developed from a 67-footer to the present dimensions of 87 ft. over all; 82 ft. 11 in. on waterline, by 19 ft. 5 in. beam and 5 ft. 8 in. draft, and call for a speed slightly in excess of 12 knots.

Main propulsion is supplied by a Cleveland Diesel, a 4-cylinder, 2-cycle unit, 6½-in. bore by 7-in. stroke developing 250 bhp. at 1,300 rpm. Being non-reversing, it is equipped with clutch, two-to-one reduction gear, and mechanical reverse gear.

The *Nambay* is of the trunk-cabin houseboat type. Aft of the forepeak is the crew's toilet; then comes the forecabin equipped with three fixed berths and one sofa. Aft again are two

cabins, one for the captain and the other a spare on the starboard side, while facing these compartments is the crew's mess.

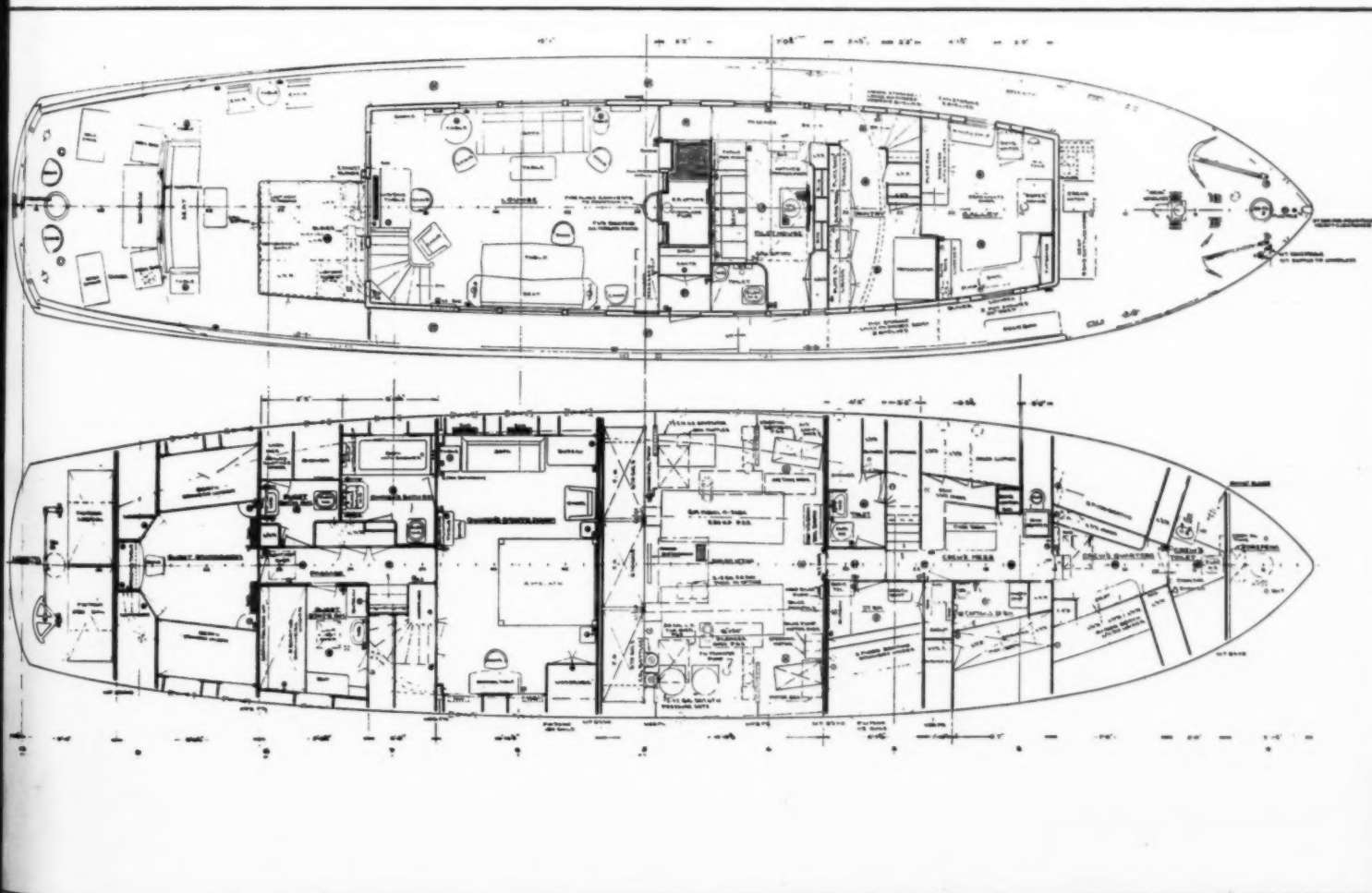
The engine room is amidships, and is 14 ft. 6 in. long by 19 ft. wide. Seeing that the main engines are only 9 ft. 8 in. long by 2 ft. 10 in. wide each, it will be appreciated that a maximum amount of room is available to the engineer. In fact, it has been possible to locate the 2,000-gallon capacity fuel tanks at the after end of this compartment without interfering with ample space.

The owner's stateroom is aft of the engine room and extends the full width of the hull, which at that point has 16 ft. interior width. Its

length is 10 ft. 6 in. Next aft, and on the starboard side, is arranged the owner's bathroom, followed by a guest's bathroom. Across the passageway is a two-berthed guest cabin occupying a space about equivalent to the two bathrooms. Another two-berthed guest's stateroom follows, and this one is 8 ft. long by 14 ft. 6 in. wide, so extends the width of the after part of the yacht. At the extreme aft are the fresh water tanks.

The pilot house is over the galley and pantry and is equipped with all modern navigation instruments, including a photo-electric pilot (eye) for keeping the yacht on a straight course. On the boat deck over the lounge is an electric blower for ship's ventilation.

The deck plans of the "Nambay" show large living space. The amidships engine room shows a well planned machinery set up.



DIESELS TAKE OVER IN STRIP MINING OPERATIONS

By L. C. MOSLEY*

THE recovery of coal by means of stripping is now one of the accepted methods of production and the growth of coal stripping during the past few years has truly been phenomenal. This is evidenced by the fact that the production of coal by strip mining in 1940 was 43,167,336 tons or 9.4% of the total production while in 1944 it was 106,763,000 tons or 15.6% of the total. Figures for 1945 are not yet available but all indications are that the percentage produced by stripping equaled or exceeded that for 1944.

Although coal and oil are competitive fuels and each bids very vigorously for the market of the other, Diesel shovels and draglines are used extensively for coal stripping service. There is a logical reason for this and, as in all industrial operations, it is a case of economics since the Diesel unit strips coal more economically than does the steam driven unit.

In the early days of coal stripping, steam was the usual and frequently the only form of power used, because the Diesel engine had not been perfected to its present high state. But all of this has changed and Diesel and electric

* Manager Mining Division, Marion Power Shovel Co., Marion, Ohio.

power are now used almost exclusively for stripping service—to such an extent that within recent years no steam shovels or draglines have been produced for stripping coal in the United States.

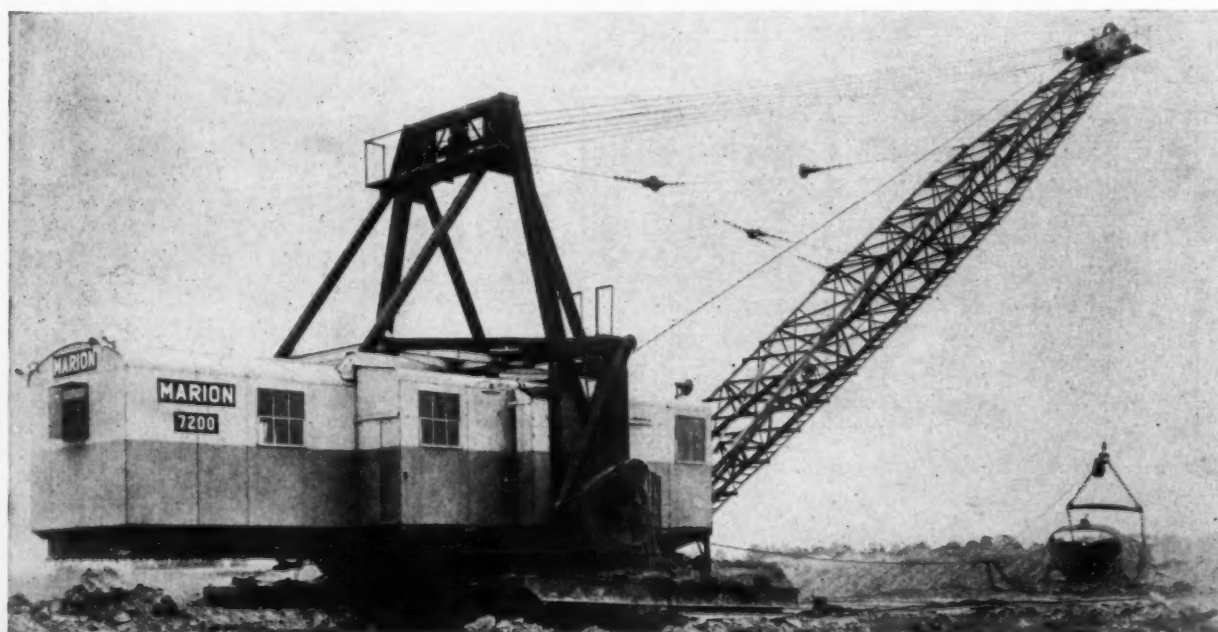
Usually the larger sizes of coal stripping units are operated with electric motors serviced by purchased power as the installations are relatively permanent. On the small and intermediate size units, Diesel engines are used extensively, especially where small areas are to be stripped making it necessary to move the stripping unit from one location to another as the coal reserves are depleted. The economy and convenience of the Diesel driven stripping unit, when compared to the electric unit that requires the installation of power lines, transformer sub-stations, etc., are readily apparent and it is easy to understand why Diesel is so popular.

There are several vitally essential requirements to be met in applying a Diesel engine to a shovel or dragline. The first and usually the most important one is that of physical size because the space available for mounting the engine is usually very limited. Low speed engines are preferred but, because of their

physical dimensions it is sometimes necessary to resort to higher speed engines than would otherwise be used if there were sufficient space to mount them. Rugged construction and accessibility for inspection and maintenance are basic requirements because continuity of operation is a necessity if the shovel or dragline is to perform properly. Other desirable features are a rising torque characteristic to provide greater "lugging" ability, flexible arrangements for driving engine accessories and machine auxiliaries and the ability of the engine to use a wide variety of fuel oils.

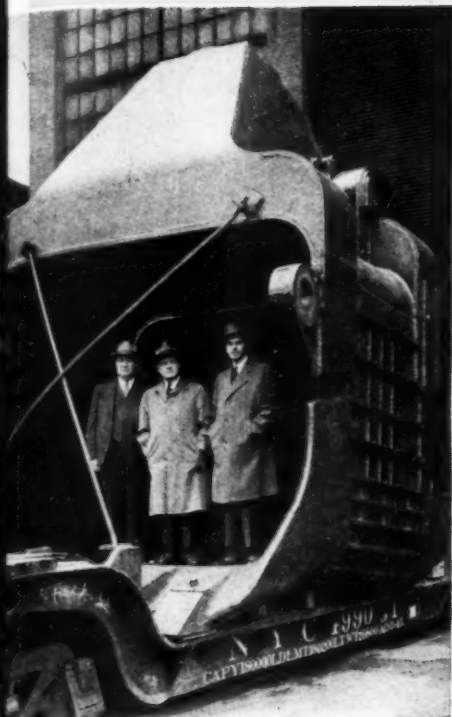
In applying the power unit, the usual arrangement is to have the shovel or dragline equipped with a single Diesel engine which furnishes power to the main motions through a system of chains or gears and shafts, the control of each motion being by means of clutches that connect the respective motions to the driving unit. Thus the Diesel engine runs continuously and the operator manipulates the necessary clutch to control the hoisting, dragging, crowding or rotating motion, depending on the type and kind of machine being used. In some instances the rotating motion is driven by an electric motor, power for which is obtained from a direct current generator driven either

Diesel-engine Marion dragline equipped with a 120-ft. boom and 6-cu. yd. bucket being used in stripping bituminous coal.



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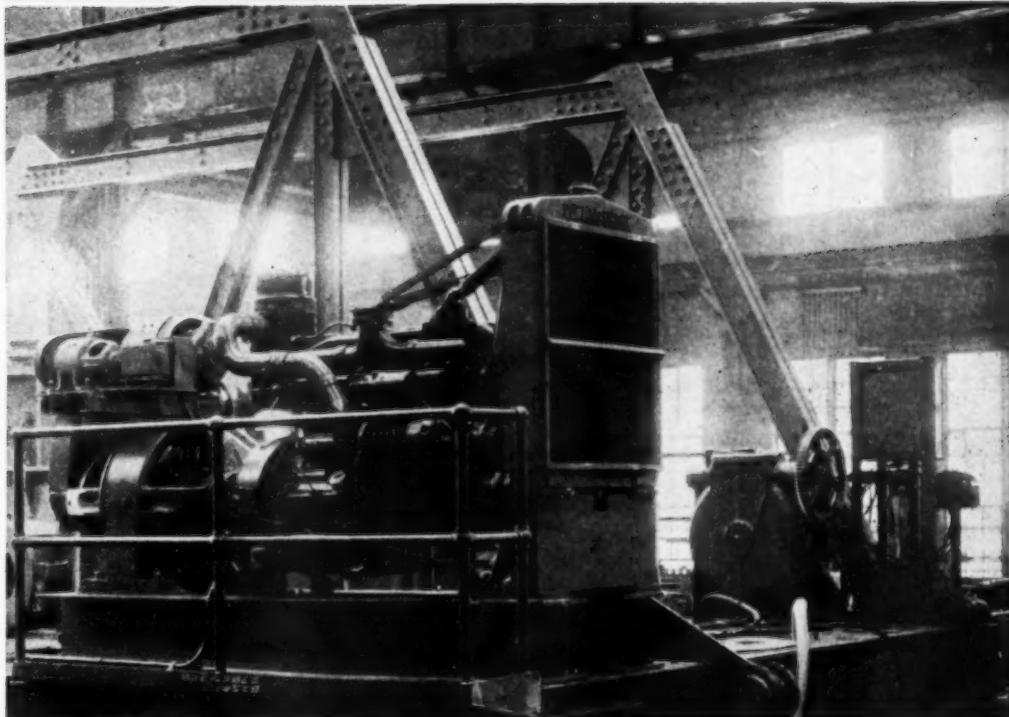


Standing inside the 35 cu. yd. dipper of the world's largest shovel is M. E. Montrose, President of the company (center) and two officials.

by the main Diesel engine or by the auxiliary Diesel engine.

Unusual care and a great deal of attention has been given to the design of the controls for the various motions to make them accessible and easy to operate. In general, all clutches are operated by air and on the larger units the brakes likewise are operated by air and

Long range, crawler-mounted, Marion Diesel shovel equipped for coal stripping.

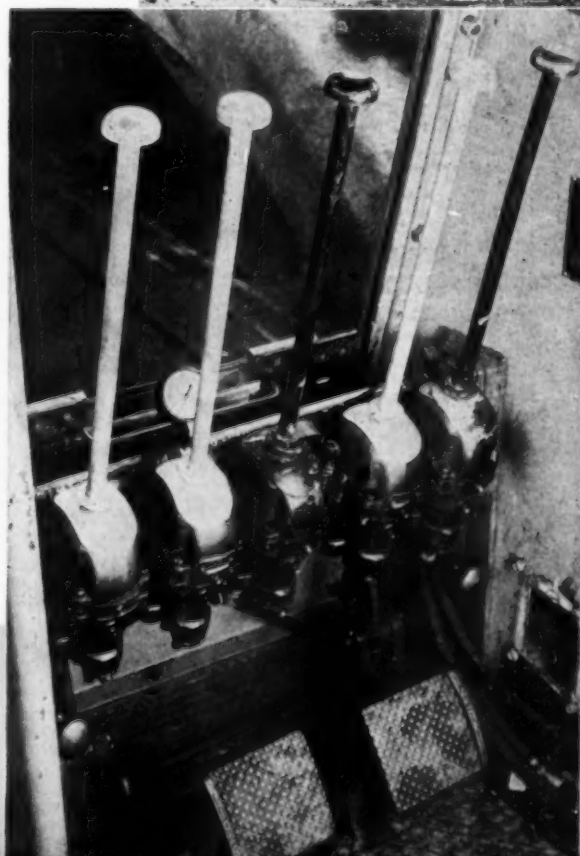


This Cummins Diesel supplies auxiliary power for rotating the cab. Another Diesel supplies power for hoisting, dragging and walking operations.

controlled by foot levers conveniently located in the cab. The various makes of Diesel engines installed in Marion Power Shovels include Buda, Caterpillar, Cummins, Fairbanks-Morse, General Motors, and Waukesha.

Progress in the development of Diesel driven shovels has kept pace with that of locomotives, trucks, tractors and other applications.

(Right) This Marion-built shovel is the largest in the world. (Below, right) Control station of a typical Diesel shovel showing foot brakes and hand controls.



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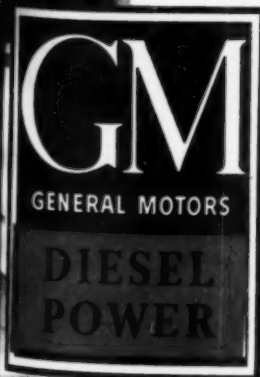


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This is the Anna Coppedge, a sleek new vessel built for just one purpose—work. And offshore and in harbors she's doing every job she's called on with an easy stride.

This 102-ft. Diesel-Electric tug is powered by a 12-cylinder, 1000 H.P. General Motors 2-cycle Diesel engine. Auxiliary power is provided by a model 3-71 General Motors Diesel.



GM
GENERAL MOTORS
**DIESEL
POWER**

CLEVELAND DIESEL ENGINE DIVISION

CLEVELAND 11, OHIO . . . ENGINES FROM 150 H. P. TO 2000 H. P.

GENERAL MOTORS

DIESEL COACHES DOUBLE MILEAGE WITH STANDARDIZED MAINTENANCE PROGRAM

THE Los Angeles Transit Lines have not only standardized on General Motors Diesel coaches, but have brought a high degree of efficiency, excellent working conditions, and full standardization, to all phases of inspection and preventive maintenance operations.

At this writing the automotive fleet that is bringing added transportation services to the swollen Los Angeles population, and is supplementing the extensive electric car lines includes over 100 gas and gas-electric coaches, 309 G.M.C. Diesel units of 45 passenger capacity, powered with 6 cyl. 165 hp. Diesel engines and 22 of 32 passenger capacity, with 4 cyl. 110 hp. engines. 108 of the larger coaches, in addition to the above, have been received and at the rate of about 15 every 10 days are being "dressed," painted, and otherwise readied for service. 200 more of the same have been ordered, along with 120 ACF-Brill Motors Co. trolley coaches with General Electric controls.

The success of the Brothers Fitzgerald who purchased this transit system in 1944, is the talk of the industry. Starting with a two-bus fleet, they have built a transportation empire that furnishes "Safe, Courteous Service" to 52 cities in the United States. With the ability to choose good men and the courage to put into practice the ideas these men have, operations and services have quickly improved. Preventive maintenance programs in every city in which they operate have eliminated a large percentage of costly road calls and consequent service interruptions.

Barney M. Larrick as Operating Manager and W. L. Craven as Superintendent of Automotive Equipment have streamlined the main garages and storage yards. They have introduced many new ideas to Los Angeles. Two of the most important, the tuning of the human element so that "everybody's looking for trouble, to discover it on its inception that steps may be immediately taken to remedy the fault, and second, the assembly line movement of all vehicles through the yards and garages.

The company operated about 350 transitliners in 1944, which averaged about 40,000 miles each, though many were out of service due to lack of operators or the lack of spare parts. There was a great improvement in 1945 due to partial delivery of 400 new G.M.C. Diesel transitliners then on order, and the benefits proceeding from new preventive maintenance practices. This year the Fitzgeralds intend to operate the coaches at their peak efficiency of approximately 70,000 to 100,000 miles a year as a coach standing idle is not earning its keep.

The way this goal is being attained makes good sense in every phase of its operation. Operators, mechanics, cleaners, janitors, station attendants, painters and even dispatchers, are always looking for trouble. The operators receive lectures on the importance of reporting faults. They are given combination "Driver's Report of Defects" and "Work Order" card.

This card must be turned in each evening filled out to either O.K. the coach or report its bad habits, not only the things that need repairing, but those things which are likely to need repairing. When a janitor sees a puddle of oil on the pavement of the storage yard, he reports a leak in the coach which always parks in that exact spot. The dispatcher, reading the yard, keeps his eyes peeled for puddles, too.

This insures a check twice daily for any oil leaks as the dispatchers keep careful check of all coaches whether they are stored for service, are in the process of cleaning, are over the inspection pits, or are in a garage for repairs. The cleaners spot loose lugs and even bent dash signs, and the painters rarely miss a loose body bolt. All this and regular inspections, too. Every coach is given a minor inspection every two thousand miles, and a major inspection every four thousand miles.

The introduction of the assembly line movement was accomplished by building a new service station at the entrance to the yard. It has three service islands and six service cabi-

nets. The underground fuel storage capacity includes two 10,000 gallon tanks for Diesel fuel, one 10,000 gallon tank for gasoline and one 8,000 gallon tank for lubricating oil. Each cabinet can service the coach with Diesel fuel, lubricating oil, water and gear oil at one stop.

Gasoline and Diesel fuel are pumped by separate pumps which feed the fluids to six service hoses on the three islands and each can deliver 150 gallons per minute. An air pump operating from a fifty gallon drum furnishes gear oil to the islands. Lubricating oil is also pumped underground to the islands.

When the driver pulls up to the station after the day's run, he turns the coach over to the service station attendant (usually a girl mechanic), and he hands her his Driver's Report card which he has signed either O.K., or B.O. (Bad Order) and why. The attendant's duties are to service the coach, then send it on its way through the washer, then to the inspection pits if it is due for an inspection, to the proper garage if it is B.O., or to its proper place in one of the three outdoor storage yards.

In the servicing of the coach a Delivery Ticket is used for every servicing. The gallon readings of the fuel at start and finish are automatically imprinted in a meter. The lubricating oil record is hand written from meter readings. All Diesel equipment including meter is painted yellow and gasoline is red, to prevent mistakes. These Delivery Tickets are collected every 24 hours and totaled against each coach every two weeks at the main office. This enables a close record to be kept of fuel and lubricating oil consumptions, with a close check on their quantities against mileages run. This is also another check on engine condition.

The washer is located on the direct route to the garage. It is a Blackhall Patent Bus and Car Washer. The large, cylindrical, revolving washing brushes are adjustable to fit to scrub the sides and top of these standard coaches. Cleaning fluid is injected through the brushes.



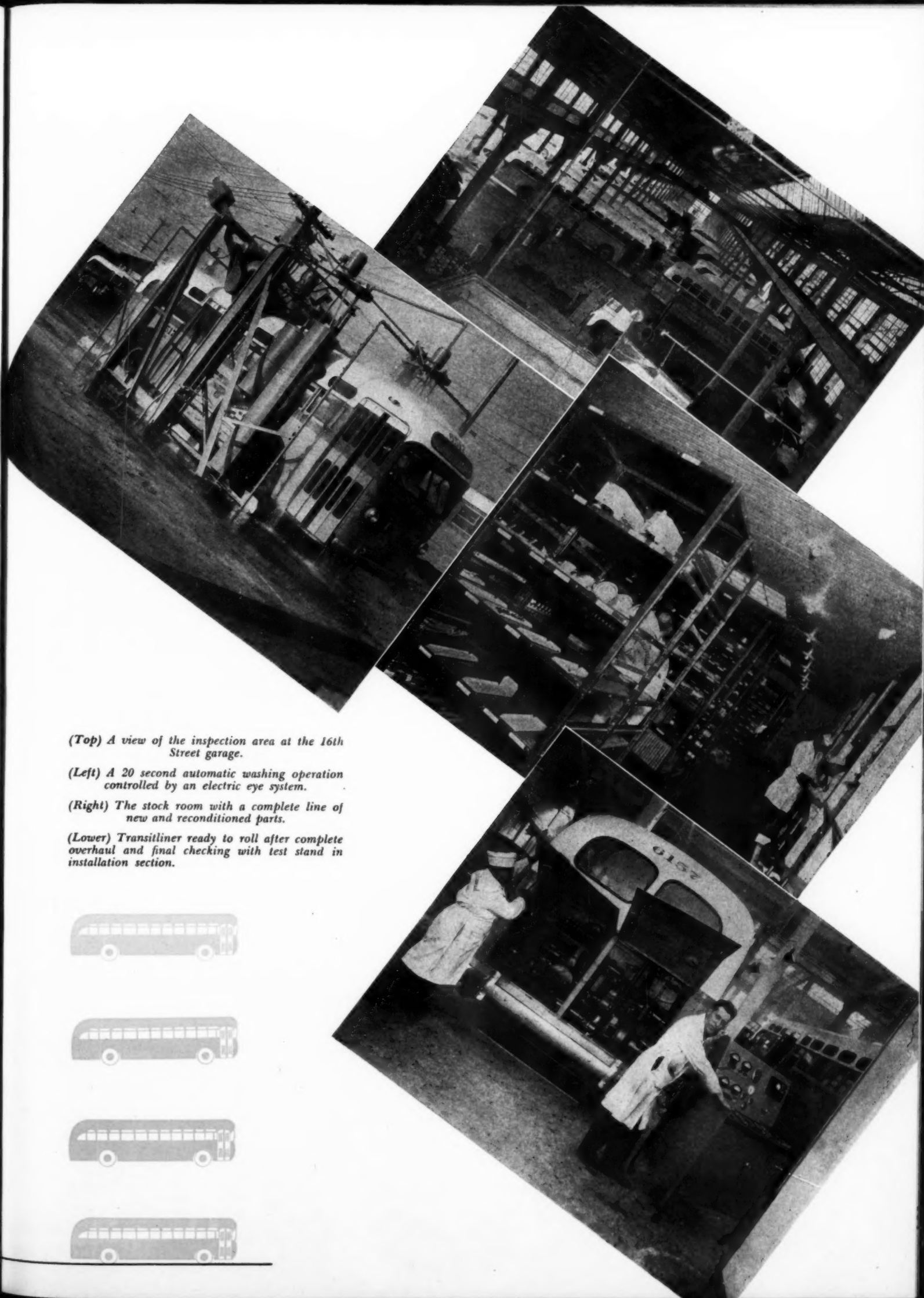
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(Top) A view of the inspection area at the 16th Street garage.

(Left) A 20 second automatic washing operation controlled by an electric eye system.

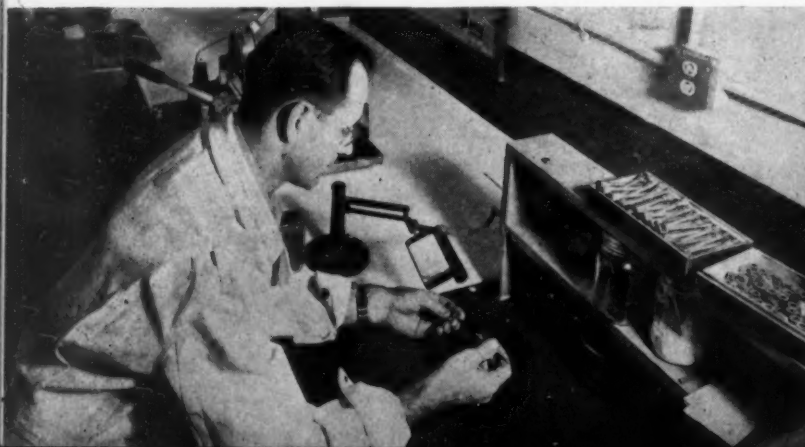
(Right) The stock room with a complete line of new and reconditioned parts.

(Lower) Transitliner ready to roll after complete overhaul and final checking with test stand in installation section.



The Diesel injectors are cleaned under a magnifying glass by a specialist in a dust proof room.

The service pits with overhead reel with water, air and oil lines, also piping to carry away the engine fumes.



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As the coach is driven at a slow, predetermined speed through the machine, the breaking of a light beam actuates an electronic device to put the washing equipment into operation. As it passes out 20 seconds later, the beam is restored and operation ceases. An elevated platform along the line is used for other top-washing, often required, the washers using long-handled brushes.

The large garage at the 16th Street yard has been beautifully painted with added light. The same applies to other shops. Two thousand gallons of paint were used to brighten up the buildings and pits. The walls and ceilings are painted aluminum with a light green base.

Floors are painted a terra cotta red, and the sides of the pits a coach top white. All machinery is painted with the L. A. Transit Lines colors—green, cream and orange. Switch boxes, of course, are painted red. The new pits, each long enough for two coaches, are flush side lighted with Benjamin standard pit lights.

There are large doors giving entry to the twelve pits from the yard on the 16th Street side. At the end towards the service station there are seven doors opening on to 15th Street. Under this arrangement, about the only time a coach is put into reverse is to find out if the gear operates. The coaches pull forward for any, and after any, servicing. This simplification of movement has saved many man hours, for it is vehicles which are constantly backing up that cause bottlenecks and accidents in any garage.

Mechanics are dressed in white coveralls. Waste rags and disposal cans are handy so that any

mechanic can reach in any direction and find something on which to wipe his hands. All engines are steam cleaned before inspection in another wing of the building across the lot.

Next to steam cleaning are stalls for service cars, and beyond are the paint shops, tire shops and brake adjustment room.

When an engine is overhauled, parts are cleaned in a solvent bath. (Complete engine overhaul is at the South Park Shops as will be outlined.) Janitors continually are keeping the large yards clean, down to the last scrap of paper or pool of oil.

Three end pits are reserved for regular inspections—the minor, two thousand mile inspection, and the four thousand mile, major inspection. Gas fumes from the coaches over the inspection pits are carried off by suction through a pipe which fits just below the muffler of the coach being tested. An overhead crane runs from end to end of the garage room, servicing all 12 pits. Overhead service reels with hoses furnish water, air and oil to the pits. Polished aluminum trays are used for oil and grease containers.

From a grease room close by, high pressure pumps supply the pits from barrels, with greases used. It is also the source of a soluble oil placed in small quantities, (about $\frac{1}{2}$ pint) in radiators to prevent corrosion. SAE 90 heavy oil, used in differentials and transmissions is supplied to the pits under pressure along with 30 oil used in engines, metered to maintain records of quantities used. An Ingersoll-Rand compressor maintains a 150-lb. air supply.

Just outside there are two sumps with top funnels which lead to underground tanks. One for "Engine Oil Only," the other for "Transmission and Differential Oil Only." This is reclaimed and returned as SAE 50 oil for use in air cleaner baths.

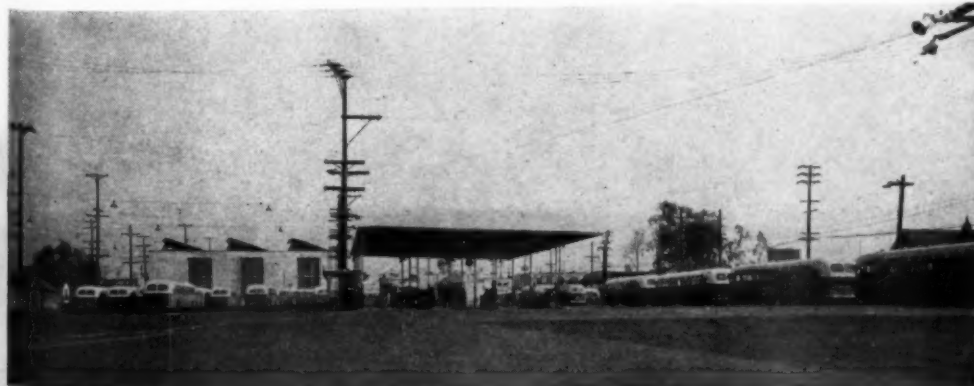
When the coach goes into the shop for repairs, the inspection sheet lists the repairs, and the only thing the mechanic has to do is to make the repairs. Test benches used on Diesels help find engine imperfections. This shows engine rpm., engine water temperature, fuel and oil pressures, and a "Sun" volts-ampere tester is used for voltage regulation. A test is made at 1950-2000 rpm. free speed, then at 1400-1500 rpm. stalling speed. The brakes are set and the engine is "revved" up against the fluid drive.

The fluid drive is now standard. It makes for much smoother coach operation, eliminates much gear shifting, and increases engine mileage frequently to more than 200,000 miles before a major overhaul is required. They are set to go from fluid to direct drive, automatically, at 21 miles per hour, going back, automatically, to fluid drive, at 13 miles per hour.

To keep equipment in tip-top shape, it is necessary to repair eight coaches per day. As they operate from 200 to 250 miles per day, this means a minor inspection every ten days and a major inspection every twenty days. With present facilities, 16 coaches per day can be inspected. The shop crew is selected. Every man on the force has proved his worth as being coach-minded before he becomes a first-class

(Right) A view of the 50 ft. service pit equipped with side lights and a hose for greasing.

(Below) The coaches to the right are lined up for their regular 2,000 mile inspection.





mechanic. Approximately 115 mechanics work on repairs alone with 50 more on inspections and work around the yards. Working hours are geared to the amount of traffic.

When apparent trouble is reported indicating the need of a complete overhaul, the coach is scheduled for a trip to the South Park Shops. Here in the Unit Removal Dept. the engine is removed for a complete overhaul. When the coach is again ready for use after its own complete overhaul, another, previously reconditioned and re-painted engine is ready for installation. A bank of ten or more of these engines are kept in readiness.

The differential, front axle, and steering gear is removed with reconditioned units taking their places. They, in turn are later replaced in other coaches after work on them is finished. The air tanks are hydrostatically tested.

The coach minus engine goes to the body shop for complete body overhaul. It also receives a complete paint job as this is usually needed as often as an engine needs its overhaul, generally from 125,000 to 225,000 miles. A special hydraulic arm is used to lift and set the engine back into the coach chassis after it has been

delivered to the installation section by a Clark Trutractor which has a 2,000 lb. hydraulic lift.

In removal, the engine is suspended on a special dolly with a screw lift. The Trutractor then picks up dolly and engine for transport to the cleaning department. Here the whole engine receives a steam-cleaning and after a complete tear-down, any part needing an additional steam and/or solvent cleaning receives it.

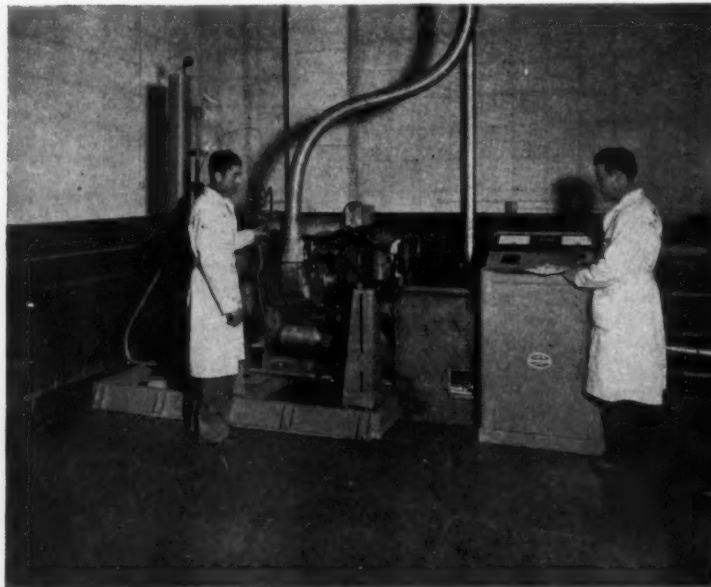
The engine parts when ready for, and received in, the engine inspection, overhaul and assembly room, receive the most meticulous attention that it is possible to give them. This department is nationally outstanding in arrangement, good housekeeping, equipment and methods employed. Assembly line procedures are employed with dismantled engine parts starting in on one side where they receive a complete inspection, with replacement of all small parts that need reconditioning. These come from the conveniently adjacent stock room where a bountiful supply of new and reconditioned parts are kept on hand.

Parts for specific engines are kept in order in special, movable parts stands. In one section, Diesel blowers receive the service recommended

by the manufacturer, General Motors, with a complete chart of procedures mounted nearby for reference. The same applies to Hydraulic Transmission Service. In another spot all fuel lines receive attention and proper replacement; fuel oil cooler cores, one of which on each radiator, is used to cool unused fuel oil before its return to the fuel tank, are air pressure tested for leaks in a water tank, at 12-lb. pressure. At the same spot radiators are tested at 10 lbs. Leaks are spotted and soldered with an oxy-acetylene torch. In fact everything necessary to bring the re-assembled engine back to its state of original perfection, is carried on in this department. In a dust-proof room, Diesel injectors are cleaned under a magnifying glass by a specialist. Tests stands are used as needed. The re-assembled engines are given Dynamometer test runs, and then if they show the proper power delivery, are given a painting before moving to the bank of units ready for re-installation.

Not everything done has been covered in this article. But everything is done that is necessary to put coaches and their engines with all of their component parts, back into service in working conditions closely comparable to the many new units constantly going into service.

Testing an overhauled General Motors Diesel engine by a dynamometer.



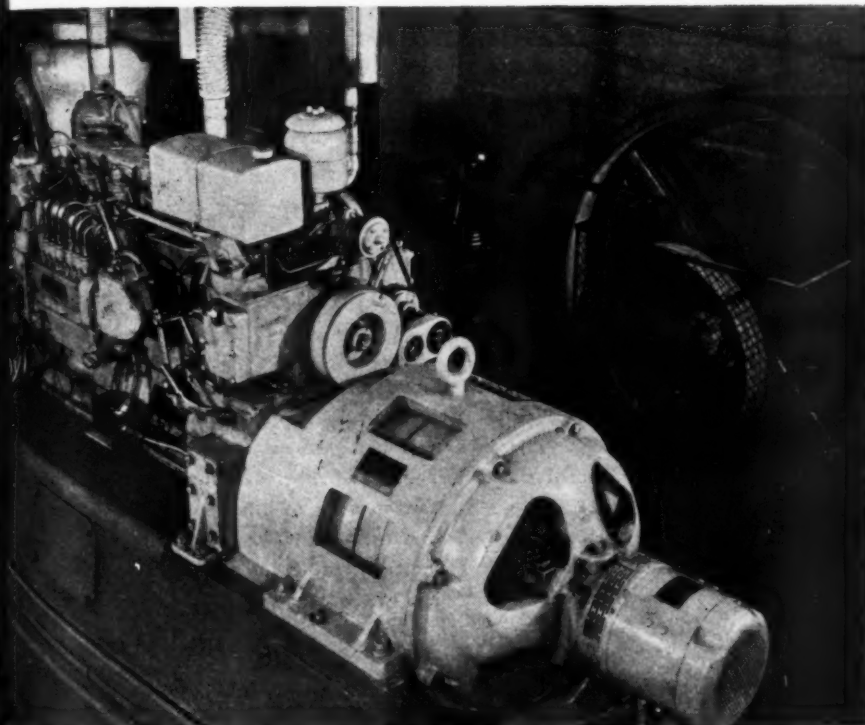
The assembly line method of engine rebuilding. Engine, completely dismantled at left side of shop ends up completely rebuilt at right.



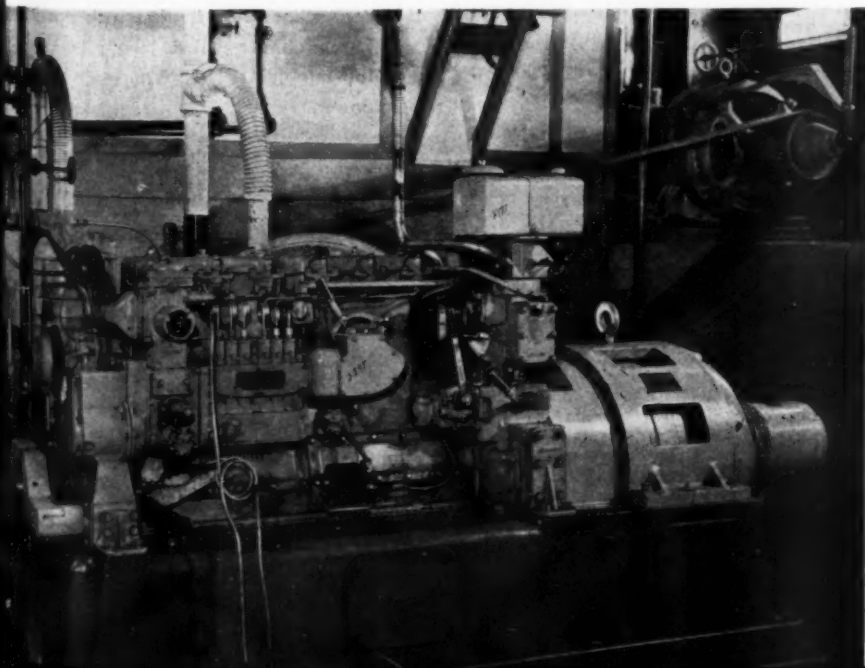
DIESELIZED NEBRASKA FLOUR MILL



Springview Flour and Grain Company which supplies electric power to Springview besides producing 60 barrels of flour daily.



"Caterpillar" Diesel generating set at mill. It has 23,000 hours of operating time.



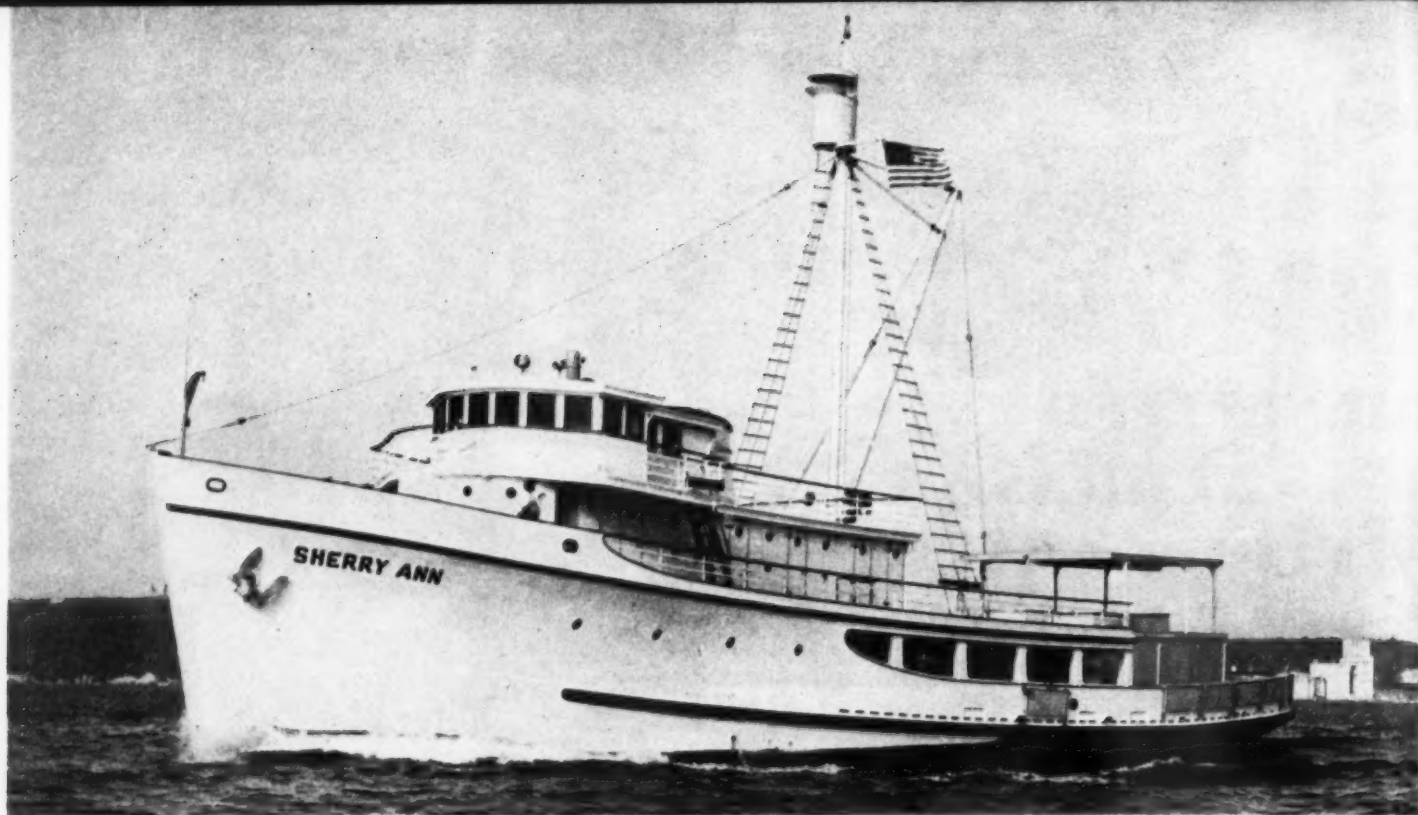
AFLOUR and grain mill can justify its existence in the eyes of the public by producing a product satisfactorily, economically and efficiently. Owner William L. Mock and Manager James H. Mock do all of that in operating the Springview Flour & Grain Co., Springview, Nebraska.

But they go further than that in their service to the community in which they have established their business. They have more than a mill in their Springview establishment. They have the Springview power company which provides electrification for the 60-barrel mill and for the 309 persons residing in the community.

The Mocks have long been noted for their high quality flour, with special emphasis on their A-1 flour and their Square Deal pancake flour which has tickled the palates of pancake devotees for many years. Thus they obey the basic commandments which must be observed in justifying their organization.

But outside the community itself few persons who know the trademark of the company know the blessings the Mock organization has showered on Springview. The equipment which powers the mill, including a "Caterpillar" Diesel generator set with a reading of more than 23,000 hours on its hour-meter, provides electric power for the city's water pumps, for its movie theatre lights, for the stores and houses in the community. And from 11 P.M. until 6 A.M. the entire load is carried by the 65 hp. Diesel set.

Another view of the Diesel which carries the entire night electrical load of Springview.



S H E R R Y A N N — N E

By CHARLES F. A. MANN

ALWAYS, in June of each year, that picturesque alliance between Puget Sound Shipbuilders and Southern California tuna fishermen, gives rise to big doings on the Tacoma waterfront, as a prelude to July 4th. This annual event, running as regularly as a clock for some 26 years now, has given rise to absolute leadership in the construction and profitable operation of the world's biggest and most colorful and most expensive fishing fleet—the Southern California tuna clipper fleet, that operates out of Los Angeles Harbor, from Wilmington and San Pedro, and San Diego, as far south as the Galapagos Islands, the coast of Peru, and now, with World War II behind us, out to Hawaii and the far-south Pacific. Why not? Tuna is still worth \$400 or better per ton!

On Sunday, June 16th, the Western Boatbuilding Company, the Van Camp Seafoods Co., Captain Manuel Machado and Leonard Salisbury, Chief Engineer, entertained for some 700 Northwest fishermen, Diesel engine bigwigs, boatbuilders and workmen who put ships together, at Old Town Dock, in honor of the formal christening ceremonies of the giant clipper *Sherry Ann*.

Sherry Ann was named for the small daughter of Capt. Machado, one of the 4 owners of the vessel. He, with Van Camp, of Western Boat and his able Chief Engineer, comprise the syndicate of managing owners. As usual, father Martin Petrich and his 5 sons, owners of Western Boat, together with Gilbert Van Camp Jr. of Van Camp Seafoods, ably represented the builder and chief absorber of the vessel's principal product, raw tuna fish, while the Machado and Salisbury families were, for the day, the proud possessors of the "Queen Elizabeth" of the high seas tuna fleet.

Frosty Atlantic seaboard engine, shipyard and fishing people have wondered for 50 years exactly "what is the difference" between Atlantic and Pacific Coast fisheries and shipbuilding? Well, after 17 years, your correspondent can come up with the bare statement: "It is the human element, and nothing else."

Where else, we ask our DIESEL PROGRESS readers, would you find cities as big as Seattle and Tacoma, that would emotionally get behind a single fishing vessel and call Sunday, June 16, a story-book sort of local holiday? In

Gloucester? In Boston? On the Chesapeake Bay? Anywhere on the Gulf? Hardly . . .

These devout Portuguese fishermen inject something else besides wondrous hulls, fine machinery and trick layouts into this fabulous business, that seems, actually, to make the Diesel engines and other machinery stand out better than on a lot of other jobs. The whole performance always, without fail, makes good summer reading for the seafaring people of this whole country. Why, nobody seems to know.

Sherry Ann is a yacht-like husky Douglas Fir hull, with fine, graceful lines that eliminate the clumsy forward bulge, generally found below the area of the pilot house, and the apple-box square stern. The result is, that with but 950 hp., this tuna clipper will do about 14 knots, instead of the usual 11-12 knots with even greater power.

Today with tuna priced where it is, the quicker you get back to port with a full load, and the faster you go back to sea for another, the more money you make.



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The vessel was designed by James Petrich, and it is a fine, yachty hull, with neat, streamlined profile. Overall dimensions are: 136 ft. x 30 ft. x 14 ft. 9 in. depth, 12 ft. loaded draft forward and 14 ft. aft, loaded. It is Hull No.163 for Western Boatbuilding Co. (larger series of ships), and will carry from 300 to 350 tons of tuna in her 11 refrigerated tanks. It is fully electrified throughout, with a 220 volt alternating current system, from 3 Caterpillar Diesel auxiliary sets, thus reducing motors and controls to the simplest and most compact design possible to cram into a design already noted for being loaded down with equipment.

Main propulsion is an 8 cylinder supercharged Enterprise Diesel engine, developing 950 hp. at 510 rpm., with cylinders 12 x 15 inches, and equipped with fresh water cooling system; full pilot house control and an Elliott-Buchi exhaust turbocharger with a nifty silent air inlet

gadget that cuts down the whine to ear level. This comparatively small power plant drives her easily at 13 knots because of the fine hull lines. A feature of the main drive, another Western Boatbuilding "first" is the first installation of the reduction gear far aft in the end of the shaft alley. The main engine is 45 feet forward of the reduction gear, hence a light shaft turning at high speed is all that needs to clutter up the shaft alley floor. The heavy tailshaft is but a few feet from the stuffing box. Western Gear Works of Seattle built this compact reduction gear, and it has a 2:1 ratio. Space aft of the thrust bearing on the main Diesel is saved by this installation and better weight distribution and more walkroom around the end of the main Diesel is achieved. Inches count in a crowded machinery space on a tuna clipper.

The general layout below is a large fuel tank

far forward; then the engine room and next the shaft-alley-pump room combination aft, with fuel and fresh water tanks far aft. A 3-bladed bronze propeller is used and a plain steel plate rudder.

On the main deck far forward is a Bosun's locker and frozen food storage compartment for the galley besides dry stores. Then comes the machinery flat over the engine room, with all controls and Master Gearmotor drive for the Photo-Electric pilot steering gear; 5 neatly mounted Baker ice machines, 2 cylinder models with A.C. motors and enclosed V-belt drive, lathes, workbench and tool stores and one 6-cylinder 50 kw. Caterpillar auxiliary A.C. generator, complete with small pony gas engine starting drive, with its own small battery starter set, built-in heat exchanger, pyrometers and tachometer, all mounted on a rubber and spring vibration dampener installation. The

NEW DELUXE DIESEL TUNA CLIPPER

generator is Allis-Chalmers 220 volt, with self-regulation voltage and load control. After this space comes the magnificent galley and mess-room, equipped with 220 volt Hughes electric range; electric coffee maker; radio and PA. loudspeakers; built in ice box, etc. Then in the open area to giving access to the fish holds, is a Western Boatbuilding Co. shell and tube brine cooler, and the bait boxes aft.

The upper deck forward has a large stowage room extending full width of the deckhouse, an 8 man and a 6 man compartment with the usual fans, rubber mattresses, reading lamps, lockers and push button gadgets to make life cozy aboard ship. Next aft on the starboard side is the toilet and the beautiful chapel is on the port side, a fixed feature with these devout Catholic Portuguese fishermen. Next aft are Masters quarters on the starboard and Chief Engineer's quarters on the port side. Afterdeck area contains two skiffs and a snappy Western Fairliner 18 ft. tuna tender powered with a 115 Chrysler Crown engine. The boom and mast each have an electric Master Gearmotor installation for lifting the mosquito deck fleet.



View of "Sherry Ann's" pilot house shows Photo electric pilot, engine controls, Weston tachometer and radio equipment.

The pilot house atop the upper deck contains a large chart room and radio room, all built into the end of the streamlined stack aft, which also gives quick access down to the machinery flat and engine room below. The pilot house

carries a magnetic compass, the photo electric pilot, engine controls, a Weston tachometer, the Intervox public address system and fathometer installation. The radio set is a giant 2-way world range phone and Morse set, built

by Lear Avia Corporation, rated at 450 watts capacity, one of the largest ever installed on any fishing vessel. A Lear direction finder is also fitted. A magnetic compass and powerful searchlight is fitted atop the pilot house.

Fuel capacity (total) is 44,000 gallons. Lube oil, 1700 gallons and fresh water 2600 gallons. Four of the fish holds are lined with steel for fuel storage on the outward voyage; 6 are regular wood lining and 3 are located in the bait box—coolwater bait boxes outbound, frozen storage fish holds inbound. All refrigeration and other piping is welded. Refrigeration piping is galvanized and all holds are lined with block cork. The large 3-compartment bait box, atop which is a shelter to keep off tropic sun, is of steel construction. The forward end of this area houses the brine coolers and ammonia condenser.

Getting back to the machinery, the whole ship is a model of unusual compactness and cleanliness. The engine room and all machinery is done in brilliant white enamel. The auxiliary electric load, not only is A.C. but it is in 3 separate units, the smaller Caterpillar set as already described, is located on the machinery flat. On each side of the after part of the engine room is mounted a V type 8 cylinder 90 kw. Caterpillar generating set, these two being likewise spring mounted. All three are controlled by the big Westinghouse master switchboard. Three 8-inch Fairbanks Morse salt water bait tank circulating pumps; 2 McDonald fresh and salt water sanitary pumps; 13 3-inch Pacific circulating pumps powered with 5 hp. U. S. motors; a 3 hp. 3 in. Fairbanks Morse fire pump; a 5 hp. 3 in. Pacific bilge pump; a Roper 2 hp. fuel oil transfer pump and a Pacific 3 inch, 5 hp. salt water circulating pump

to serve the Ross heat exchanger on the main Diesel are the principal items of pumping equipment. A De Laval lube oil purifier will be installed in the south.

Construction features Douglas fir timbers and planking; plywood and mahogany on the deck houses, and light steel fabricated units to cut down bulk in tight places. A distinctive feature is full fir plywood engine room lining to assure a constant crack-free interior, easy to keep painted and keep clean. All tanks are welded.

Lighting is high-density, fully shielded. A.C. type found in the best stores or hotels.

"Chicken of the Sea" and "White Star" canned tuna, 300 tons at a crack, will originate exclusively on *Sherry Ann*, the newest and the finest of the clippers.



Little Sherry Ann, sponsor of the vessel poses with her parents, Captain and Mrs. Machado, Monsignor W. J. Noonan stands at left with two altar boys, while at right is the musician who played for the Blessing Ceremony.



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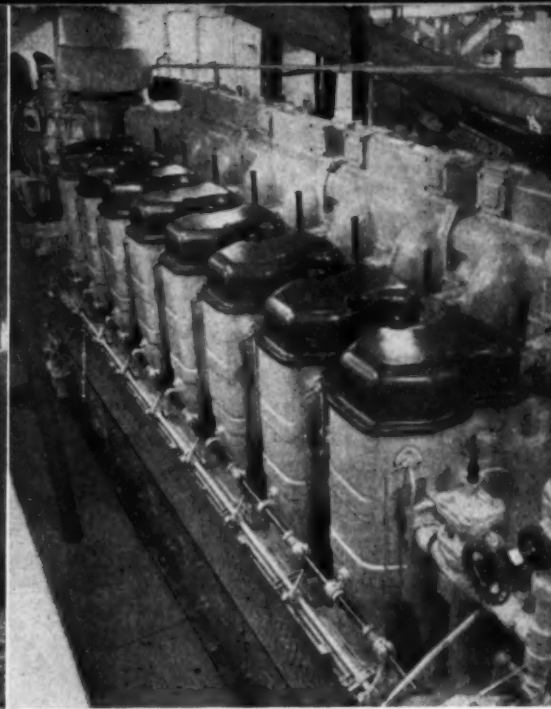
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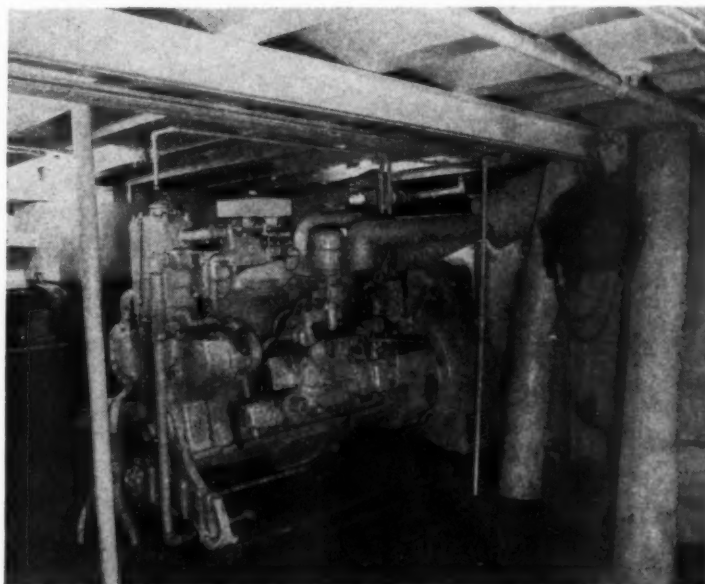
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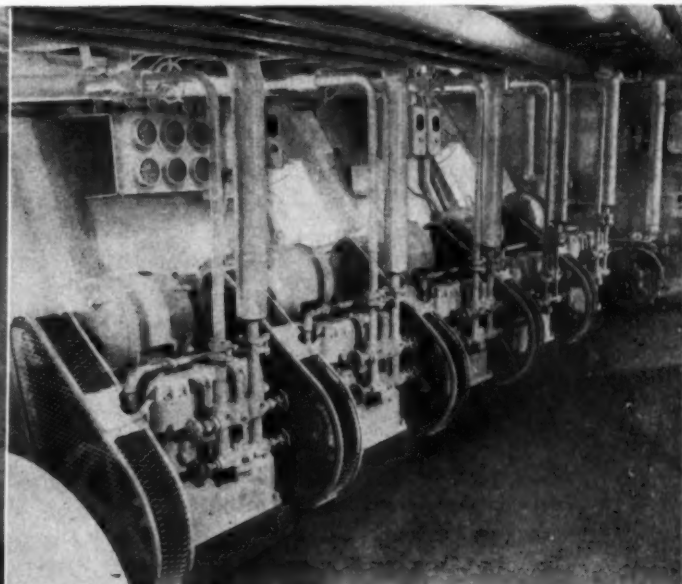
This beautiful little altar located on the port side of the "Sherry Ann" is visited by each member of the crew twice daily.



View of the 8 cylinder Enterprise Diesel which supplies propulsion power. It is equipped with an Elliott-Buchi turbocharger.



View of the 6 cylinder Caterpillar auxiliary generating set aboard the vessel.



Baker ice machines neatly located on the machinery flat over the engine room.

Compact galley of the "Sherry Ann." Note P. A. speaker mounted on bulkhead at left.

Engine room view of the vessel showing the main engine (right), one of three Caterpillar auxiliaries (left) and two Fairbanks Morse salt water circulating pumps (upper right).



BUTANE CONVERSIONS

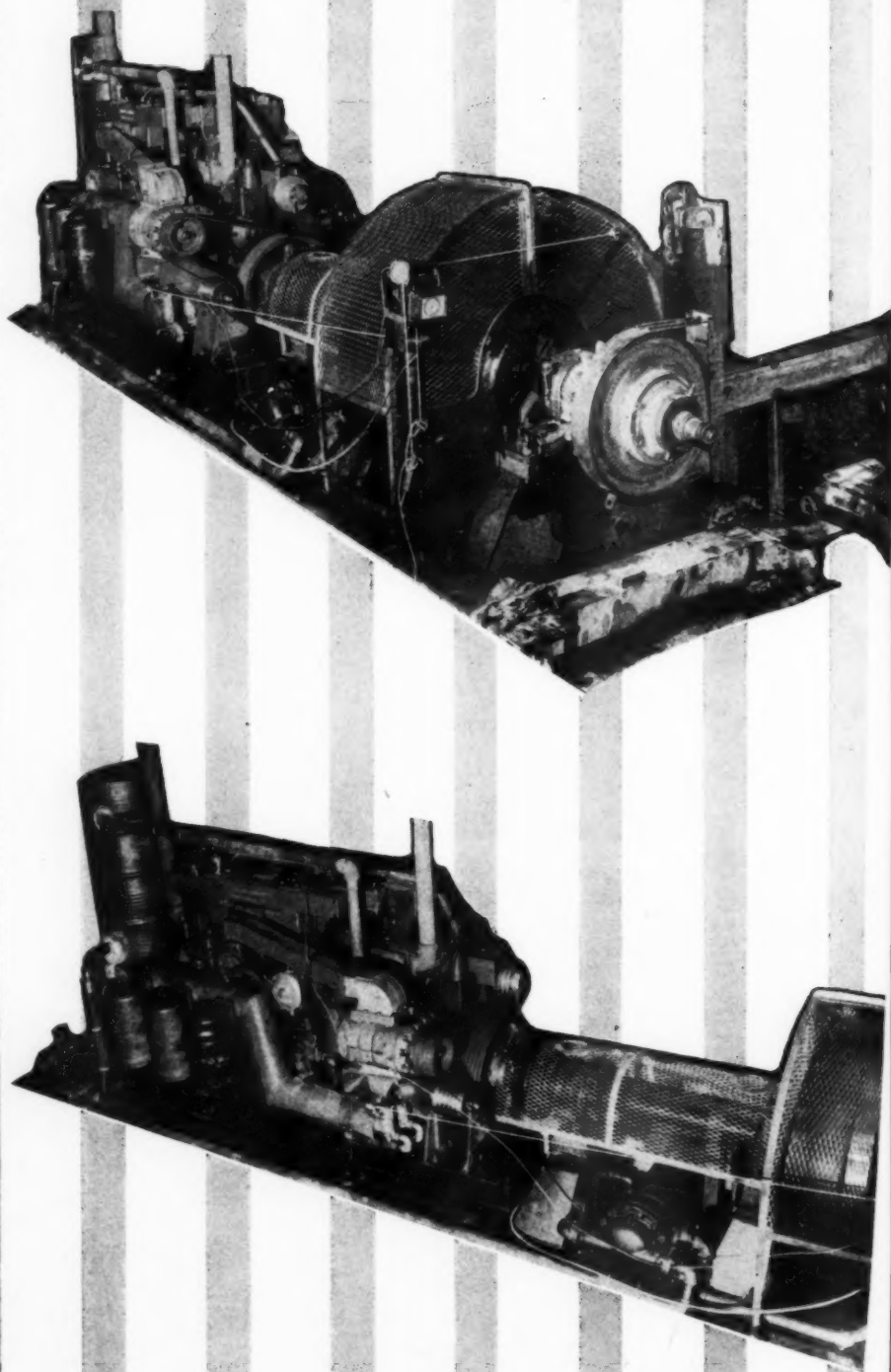
DEEP in the heart of Texas, Mr. Harlow Sammons has developed a new sideline for his business which may develop into a full time venture. He converts Diesel engines into butane burners and they love it, so much so in fact, that they deliver 50 hp. more per engine while utilizing the inexpensive butane or natural gas which is so plentiful in the oil fields.

The Cummins Model L Diesel lends itself especially well to this conversion because of its rugged construction. The actual conversion consists in removing the fuel injection equipment and installing spark plugs and carburetion equipment. New alloy pistons are installed which reduce the compression ratio from 16-1 down to 7-1. Aside from cutting the weight of the pistons in half this change lowers compression pressures in the engine from 500 psi. to 135 psi. and results in longer engine life through lighter bearing loads.

In one recent conversion Mr. Sammons installed a Pesco Products B-W supercharger on a Model L Cummins and found that the combination of supercharging and gas burning increased the horsepower of the engine from 225 to 350.

Oil field operators like the converted engines which have proved to be very economical. The engines require a change of oil only every 25 days on the average and do not need the exacting maintenance which Diesels require. The first pair of converted engines operated for five years with one ring and valve job at the end of the third year. At the end of period the engines were brought in for a major overhaul and found to be in fairly good condition.

Two illustrations of the model L-Cummins Diesel engine which was converted to a gas engine. The most recent change was the installing of the Pesco Products B-W supercharger which raised the rating of the engine from 225 hp. to 350 hp. The hydraulic coupling was installed to measure the horsepower output.





What have these parts in common?

These are metal powder parts by Moraine.

They are typical of many parts made by powder metallurgy for a variety of applications—and for varied reasons. Some require the oil-retaining, self-lubricating quality which cannot be duplicated by orthodox materials. Others take advantage of the elimination of costly and complex secondary machining operations. Still others utilize the fine finish and close sectional tolerances attainable in this new field of fabrication.

But whatever the application and whatever the advantage, these metal powder parts have one thing in common: *All are produced in volume*, for volume is the key to the practicability and economy of powder metallurgy at Moraine. The nature of tooling and methods makes large, continuous runs essential to satisfactory pricing and delivery.

If your production involves a large need for small parts, fabricated to practical tolerances with a fine finish, consult Moraine Products. Metal powder parts by Moraine may prove to be the answer to lower costs, improved quality.

**METAL POWDER PARTS
BY MORaine**

MORaine PRODUCTS DIVISION OF **GENERAL MOTORS**
DAYTON, OHIO

TRENTON DIESELS LICK A PROBLEM

THE Trenton Transit Company could offer no demobilization program to its overworked bus fleet when the war ended. It was Camp Dix that was in the demobilization business, and in it aplenty. Millions of men were to be released and they needed transportation to Trenton, 20 miles away. The Trenton Transit Company had been under contract with the government since 1940 to supply this transportation and already had averaged 5,700 G.I. passengers a day plus the civilian passengers it carried on its regular city runs. All this with a fleet of 44 Diesel coaches and 146 gasoline powered buses is quite remarkable.

After VJ Day, the transportation demands grew enormous. In the month of September, 1945, 309,335 G.I.'s were carried in the company's equipment. Throughout the remainder of the year totals remained high. Buses were in almost continuous operation. Maintenance time had to be cut drastically.

The 44 Diesel coaches held up well under the strain, better than the gasoline jobs but the best equipment has to have its day in the garage.

It was found that the Diesels were getting heavy sludge formations in the air scavenging ports which reduced intake air so much as to cut efficiency badly. This was happening to engines with 50,000 miles on their records since previous cleanings.

The removal of these sludge deposits was not as simple as one might suspect. It required the work of a Diesel mechanic a full day to clean one such engine, thus taking him away from other serious repair work. Besides this the use of the vehicle was lost. It was necessary for the mechanic to take over the grimy and tedious job of cleaning the 64 ports in each liner of the 4 and 6 cylinder General Motors engines. Even then the best mechanic couldn't prevent some of the sludge from dropping into the engine crankcase to cause more trouble.

It was evident that some sort of a solution was

needed to the problem. Several months ago, L. V. Lewis, Superintendent of Equipment for the Trenton Traction Company, was contacted by the representatives of a Camden firm who claimed an end to this problem and suggested a fully guaranteed test on the equipment of the Traction Company.

It was the Miller Manufacturing Company which spent a good many years in the development of detergents and additives for petroleum products and within the past year had developed a product designed for Diesel fuel control. Its action as a sludge remover in storage tanks was proven. Now it was requested that the solvent be used to remove sludge from the engine itself.

The Transit Company acquiesced and Diesel Coach #516 was selected for the test, which was to cover a period of nine days. On the first day the General Motors 4-71 Diesel was removed from the bus and the side-covers taken off revealing the almost completely sludged intake ports. Photographs of the clogged ports were taken and the engine reassembled and put back into the bus which then drove off to haul more G.I.'s from Fort Dix. The only change that had been made was the addition of 5 ounces of the Miller additive to the 80 gallons of fuel which the bus carried. For nine days, according to Mr. Lewis, the bus operated with gradually increasing efficiency, less smoke, and easier starts. At the end of the period, 20 ounces of the additive had been used at a ratio of one part additive to 2,000 parts fuel. Bus #516 was brought in and the engine removed at the end of the ninth day. The scavenging ports were clean. The bus was operating efficiently with maximum power. This had been done at a cost of 72¢ with no loss of operating time, no expensive labor cost. Furthermore there will be no need for future worry on the part of the Traction Company. Engines may be kept clean by a greatly reduced proportion of additive in the fuel. As little as one gallon for 6,000 gallons of fuel will keep sludge formation under control. The additive may be put directly into the fuel storage tanks where it will act as a

sludge preventative and detergent both within the tank and in the engines using the fuel.

Misol, the name given the additive, has been tested by a leading research laboratory and found harmless to metals and gaskets. It contains no alcohol, acetone or harmful acids. Its flash point is as high as Diesel fuel. Its action in the cylinder during combustion is to dissolve sludge and keep injectors free from carbon, gum and wax. It is designed to keep feed lines and filters free of water and sludge. The chemical action tends to break down the heavy sludge-forming carbon molecules in the fuel, thus making it again suitable for Diesel fuel. The action on water is much the same as it disperses water formations into finely divided droplets which are assimilated by the fuel itself and will not clog filters or injectors.

Such actual operating success as the test by the Trenton Traction Company proved to be should be the go ahead signal in this new field of Diesel fuel control as a means of cutting valuable maintenance time.



Two contrasting views of the before and after condition of Diesel engine's intake ports. Upper view shows clogged ports, the lower view shows the cleaning effect of fuel additive after a nine day test period.



Some of the Trenton Traction Company's Diesel coaches lined up outside the Trenton shop.



THE OUTLOOK FOR THE DIESEL ENGINE

An Interview With Colonel Oliver F. Allen,
As Reported by Orville Adams

THE position of the Diesel engine in the power generating field is quite different from what it was before the war, according to Lt. Col. Oliver F. Allen, Consulting Engineer, New York City. The influence of World War II on the development of the Diesel engine, including its design and application, has rendered obsolete a great deal of our past thinking on this subject. Colonel Allen has made many worthwhile contributions to the literature of Diesel engines. During World War I he operated a large number of isolated plants in France including Diesels from several countries. During World War II he did research work for the United States Government Services which is not available for publication. He had an opportunity to study the latest technical developments and to analyze the influence of these developments upon the Diesel engine.

Recently, the Colonel was asked about these new developments from the viewpoint of the practical student, the engineer, the operator and the general public. It was pointed out that many seek additional facts regarding the theory, design and practical operation of the Diesel engine.

Colonel Allen has inspected most of the Diesel engine manufacturing plants in this country and Europe and has recently had an opportunity to review the records in the offices of the Chief of Engineers of the United States Army and the Bureau of Ships of the United States Navy about captured enemy materiel used during World War II. These disclosures led him to further inquiries on recent developments of the Diesel engine in Switzerland and England. As a result, he was able to arrange for the disclosure of a great deal of information regarding such subjects as rocket propulsion, gas turbines and Diesels. The information indicates that these developments will influence the future of the Diesel engine to a very considerable extent. However, Colonel Allen pointed out, nothing was disclosed that would detract from the Diesel engine assuming a still more important place among prime-movers. These investigations did indicate that future developments, both technical and commercial, will very likely follow a direction quite different from the past. The results of these extended investigations, bringing the Diesel picture up to the present moment with material and facts, indicating that the recent develop-



Colonel Oliver F. Allen

ments in rocket and gas turbines will have a profound influence upon the future development of the Diesel engine are fully discussed in Colonel Allen's forthcoming book, "Modern Diesel."

Colonel Allen's contact with the Diesel engine began while Doctor Diesel was alive. He has kept in close touch with every development of any consequence during the past fifty years. He has an intimate knowledge of the success and failures of many designs that have come and gone during that time. He has seen the struggles of engineers and designers to develop and improve the modern Diesel engine. Very few men in the world today are better qualified than Colonel Allen to sift this vast record of the growth of Diesel engine use all over the world; to crystallize the thinking; to pass on to the young engineer of today the sum and substance of what has been accomplished, and to look ahead a little as to what is to come.

The Colonel draws a number of important conclusions and predicts a greater opportunity than ever before for the use of the Diesel. There are many incentives to the scientist, to the inventors, and to the manufacturers to produce and market engines substantially superior to those of the past. He observes that Diesel engines must be capable of competing with the gas turbines and the older types of power, all of which are striving to reduce power and installation costs in competition with the Diesel engine.

He goes further than most writers to say that there is a chance for an enterprising inventor to produce a Diesel engine which will enable the bus and the truck to keep up with the best pleasure car at traffic light stops and also to operate efficiently on long runs. He observes that many gasoline engines in these vehicles fail to do this even today.

More Diesels will be used than ever before. There will probably be a substantial development in new and improved designs, in lower cost of production, and in sales promotion. In many respects the gas turbine is the child of the compression ignition engine. Diesel experience was of great importance in the development of the gas turbine. There is no doubt that the Diesel engine offers young men a broader prospect for success than ever before. This is in spite of the fact that its trend of design and application may take a different turn in the future.

This encouraging outlook for Diesel engines as predicted by Colonel Allen is based upon a few very important improvements and advancements made during World War II. These include:

1. Improved designs and the development of bearing material that will withstand greater pressures and temperatures than ever before imposed upon these members.
2. Improved injection equipment providing more accurate timing and fuel metering, especially unit injectors.
3. Development of more effective methods of lubrication and better lubricating oils.
4. The development of cylinder liner material that will greatly prolong the life of a Diesel cylinder.
5. The development of new designs such as opposed pistons, new type welded construction, coupled with advanced methods of heat treating and X-ray inspection of engine parts after they are fabricated.
6. Since great strides are being made in the use of coal dust directly in the gas turbines, Colonel Allen makes the prediction that means may be developed to use powdered coal in the Diesel engines. The Diesel engine of the future must compete with the coal-burning gas turbine.
7. The Dieselization of the railways will continue at a rapid pace, with new and improved designs.

. . . . And now please turn to page 81

THE ODYSSEY OF THE DIESEL TUG

By W. P. HODGINS*

WHEN the keel of the Diesel tug *Eleu* was laid in the Union plant yard of the Bethlehem Steel Company on the shores of San Francisco in December 1928, little did anyone realize that the ship would have a significant part in the preparation of our country's defenses and the laying of the groundwork for those first battles in the dark days following Pearl Harbor.

On that day in May 1929 when she proudly sailed for Honolulu, the most powerful American Diesel tug of her time, there was aboard her a young Irish-Hawaiian boy named Harry Green, who, as 1st Assistant Engineer, was traveling home after his first trip away from the Hawaiian Islands.

Following her acceptance trials, there were twelve and one-half years of hard towing work. Day and night she brought her 175 ft. steel barges, each laden with 1,100 tons of fresh pineapple, into the harbor of Honolulu, supplying the Hawaiian Pineapple Company cannery with fresh fruit.

Never once in those twelve years was it ever necessary to wait for repairs, or delay a trip

* Operating Superintendent, Isleways Ltd., Honolulu, T. H.

Chief Engineer Harry Green, who for nearly seventeen years has run these two Fairbanks-Morse Diesels, rests on the controls of his faithful equipment.

because of a breakdown. During this time the *Eleu* was to tow more than 720,000 tons of fresh pineapple for processing, which meant that she alone transported nearly 1/8 of the world's supply of this valuable product each year.

In 1941, with the clouds of war rapidly gathering over the Pacific, her operators, Isleways, Limited, a subsidiary of the Hawaiian Pineapple Company, were called into a secret conference with Chief of Engineers, United States Army, and asked if she could tow a barge-load of airplane gasoline to the South Pacific, desperately needed in the development of the western defenses of the United States. Their answer was that she not only could, but would, gladly undertake this new task.

On November 21, 1941, the *Eleu* sailed for Christmas Island on the first leg of a trip which was to be the beginning of a series of many in the service of her country.

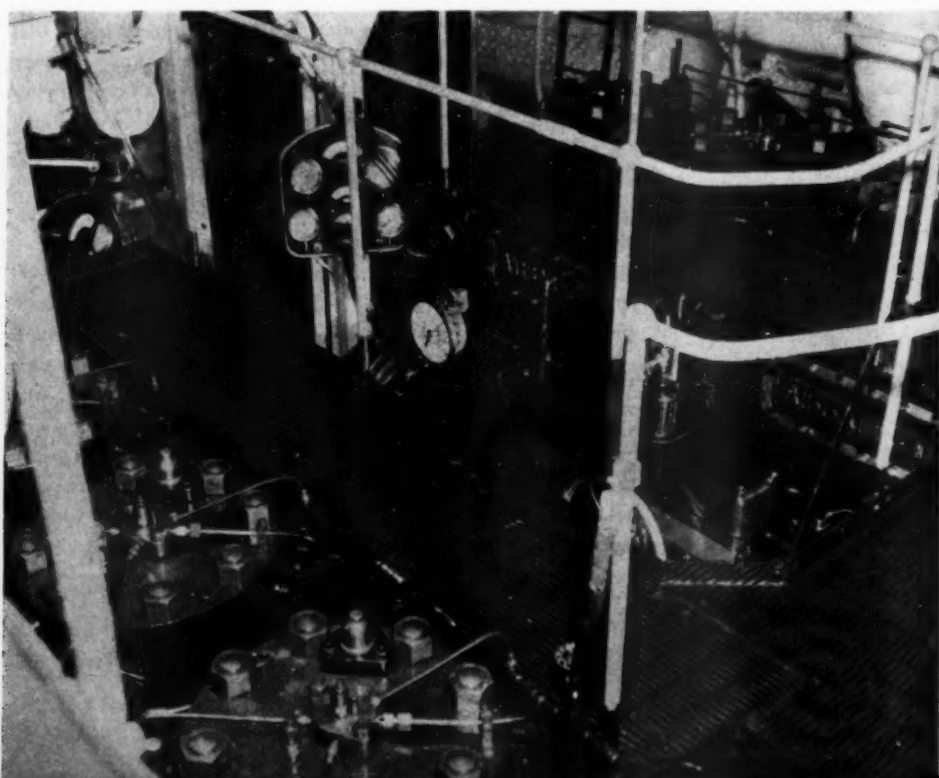
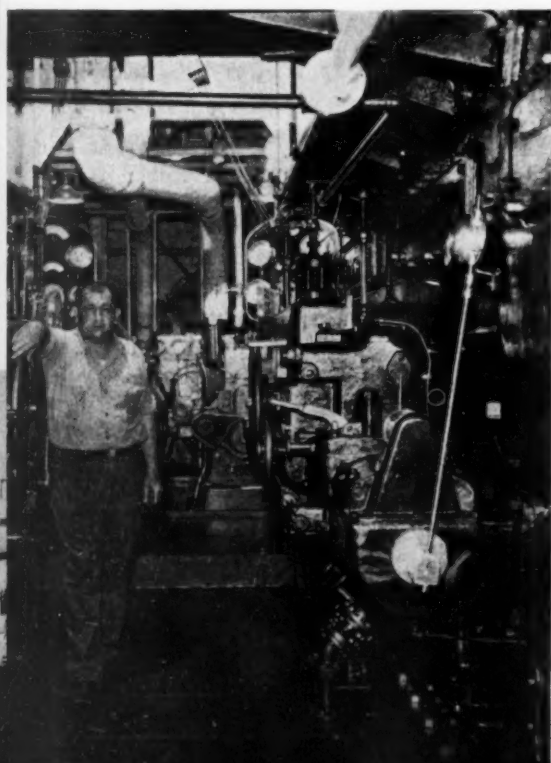
Sixteen days later, while traveling between Christmas and Palmyra Island, another outpost Pacific atoll, the ship's radio broke the rhythm of the steady throbbing engines, "Pearl Harbor has been attacked." Here was an unarmed vessel, a thousand miles from home, with no identification codes, and no experience

in modern warfare, traveling alone in submarine infested waters with her cargo of aviation gasoline. The crew realized there was no turning back now, their cargo must get through, so it was "Darken ship and Full Ahead for Palmyra Island."

There followed weeks of towing, with the hearts of the crew filled with anxiety for the fate of their families and homes in Honolulu, and it was not until the latter part of January 1942 that they again nosed their vessel into its familiar home berth and found all their loved ones safe and well.

At this time her operators realized that with untold years of war ahead it was only fair she be given the overhaul she deserved. Since her two Fairbanks-Morse engines were installed in 1929, she had, in twelve years, traveled 210,461 miles or about eight times the distance around the world, without a single failure. The engines were torn down and modernized to back-flow scavenging with high pressure precision fuel injection and open-head combustion. By May 1942 she was again ready for sea, and there followed trip after trip to the North and South Pacific in the prosecution of the war. Still, with all this work for the United States Government, her interim time was utilized towing cargoes of fresh pineapple, which

Looking across the top of the two, 4 cylinder Fairbanks-Morse main Diesel engines, showing the control wheel, engineroom telegraph and gauge board.

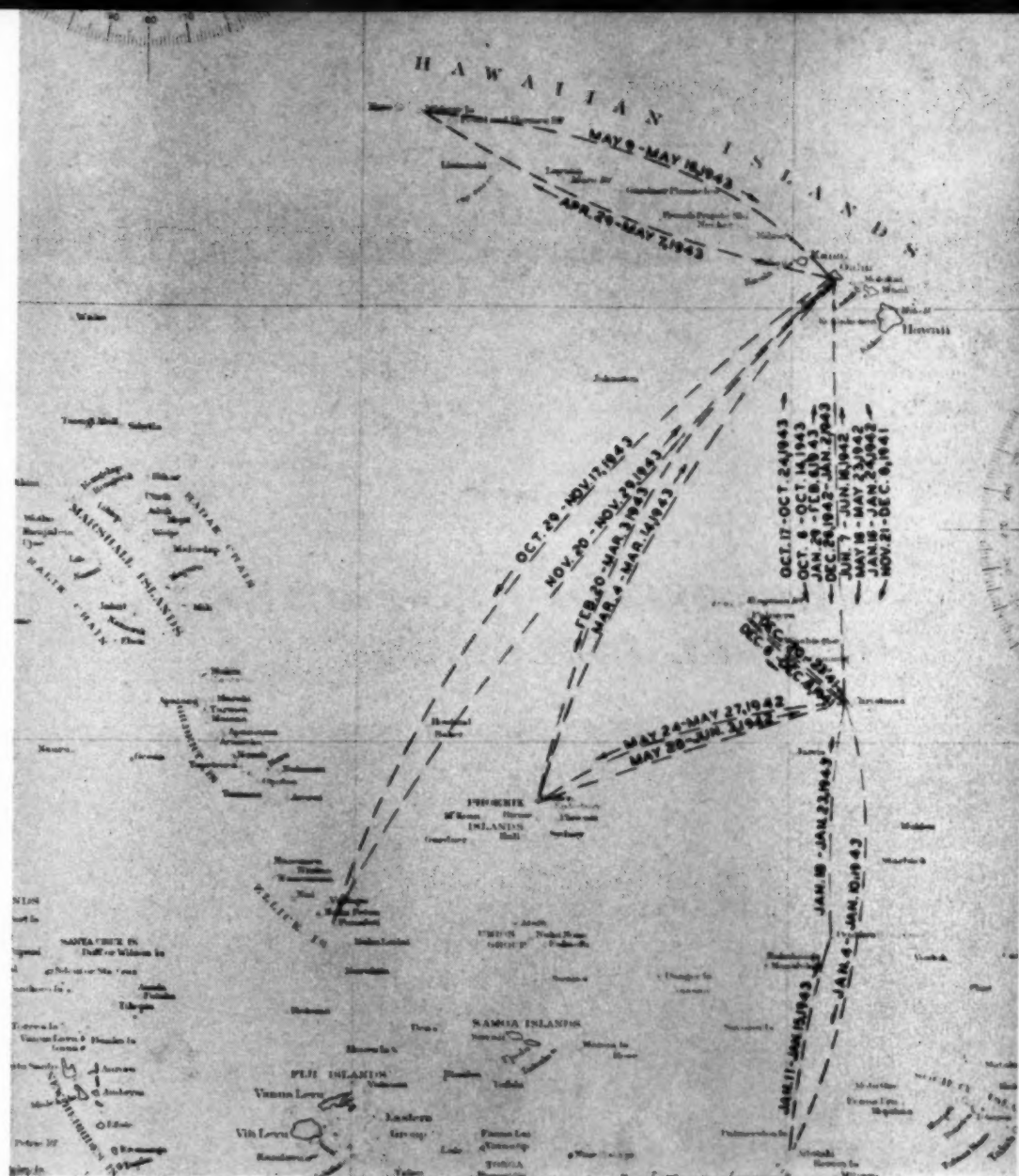


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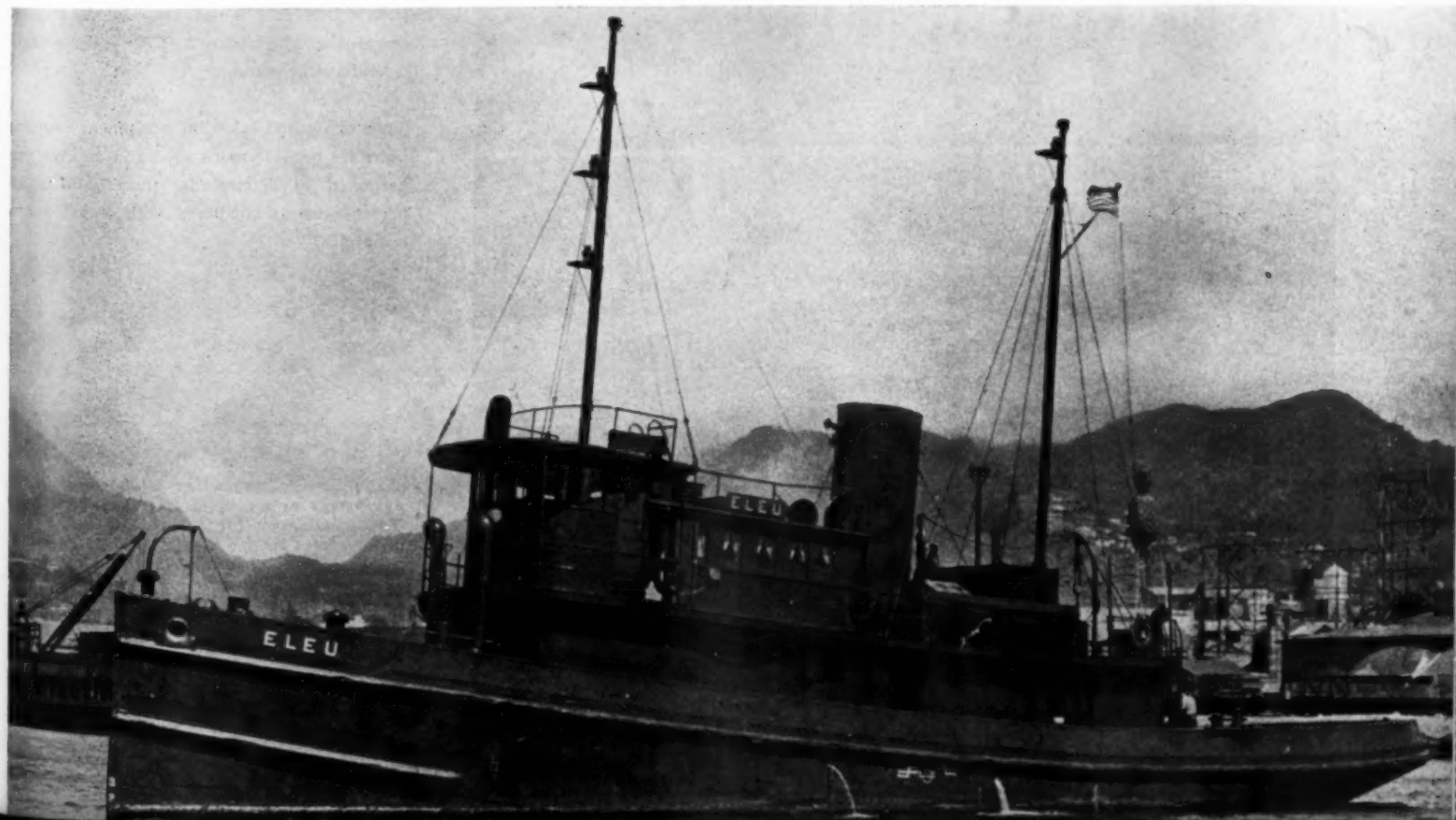
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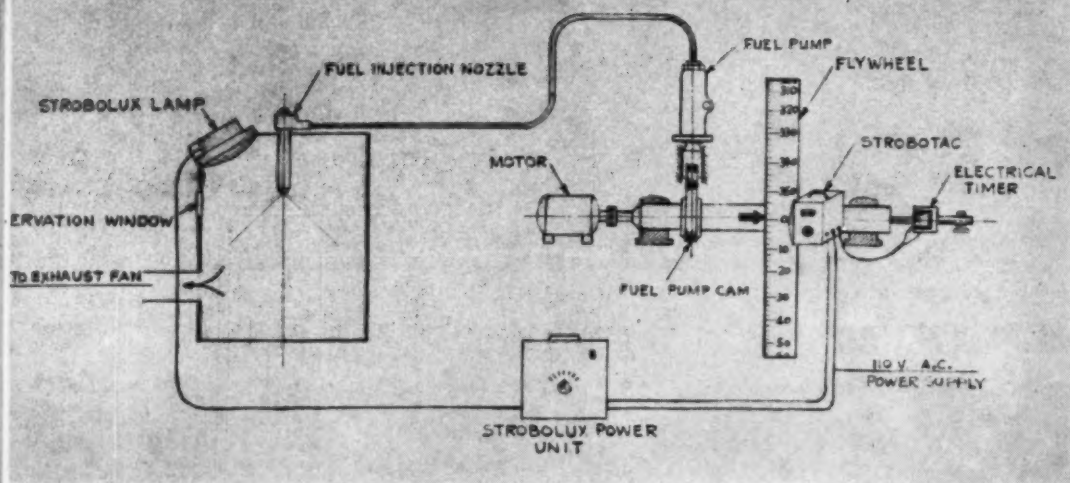
Well can Isleways, Limited be proud of its tug *Eleu* with its Fairbanks-Morse engines, its Irish-Hawaiian Chief Engineer, Harry Green, and all the loyal crew who sailed, unescorted, the war torn Pacific, to help make the seas free.

A black and white photograph showing the bow of a ship named 'ELEU'. The ship is dark-colored with the name 'ELEU' in white capital letters on the bow. A crane or derrick is visible on the left side of the bow. The ship is on the water, and a hazy, mountainous coastline is visible in the background under a cloudy sky.



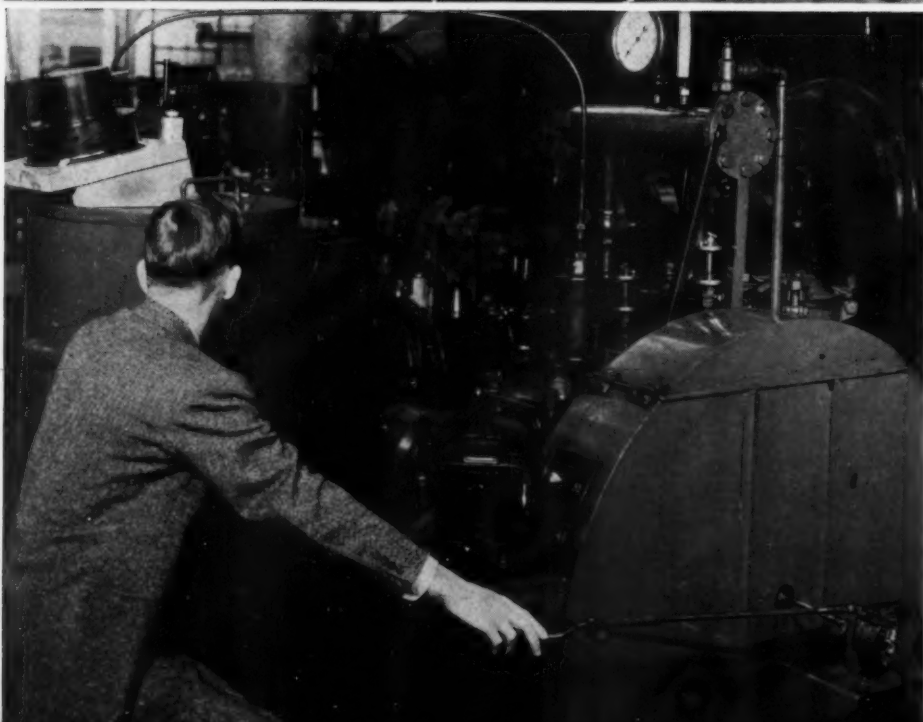
(Above) The voyages of the "M. V. Eleu," during World War II, transporting supplies for the armed forces of the United States.





Schematic drawing of the setup used for stroboscopic inspection of fuel injection.

STROBOSCOPIC INSPECTION OF FUEL INJECTION



DIESEL engine and equipment manufacturers are now utilizing the science of electronics to speed production. The Nordberg Manufacturing Company has developed an apparatus for accurate study of fuel injection characteristics which utilizes the stroboscopic method. In conjunction with the General Radio Company, Nordberg engineers have come forth with a timesaving and inexpensive method of testing pump and nozzle performance.

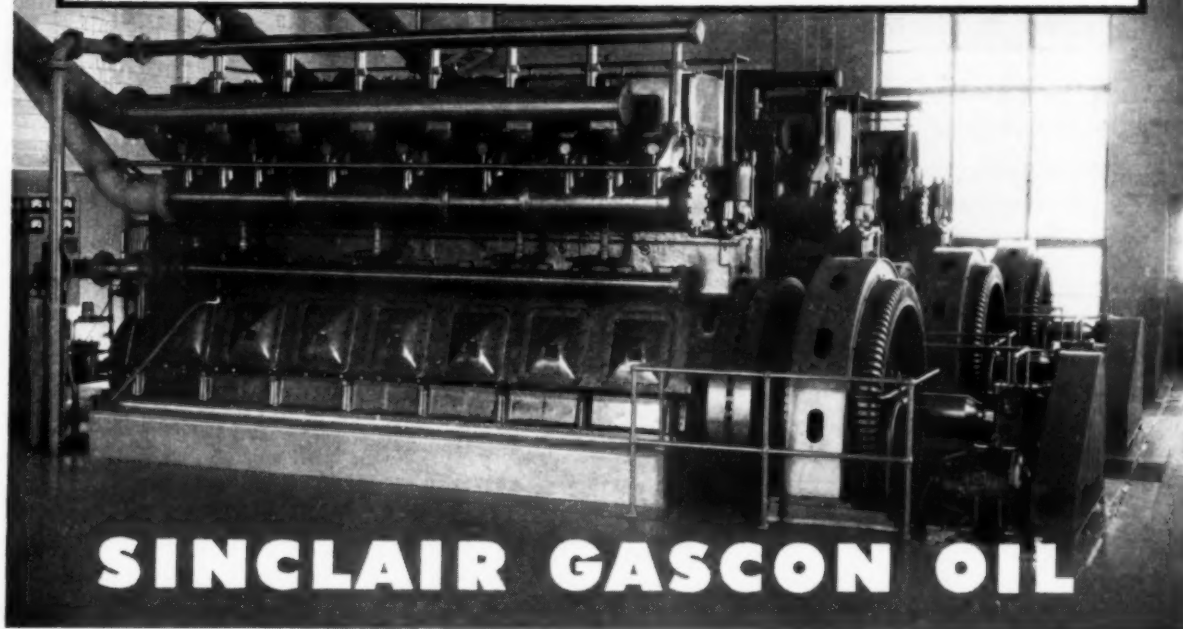
From the schematic drawing on this page the general arrangement can be seen. A fuel pump actuated by a cam, and an injection nozzle with connecting tubing are arranged as nearly as possible to reproduce actual operating conditions. The camshaft is driven at engine speed by a gear reduction motor. Attached to the camshaft is an electrical timer and a flywheel whose periphery is divided into and marked by degrees. The fuel spray from the injection nozzle is observed through a window in an almost closed container which eliminates light. The fuel spray is observed by the stroboscopic flash emanating from a General Radio Strobolux which is timed by an electrical timer driven by the camshaft, making possible degree by degree observations by simply changing the position of the timer contacts. Synchronized with the Strobolux is a Strobotac which is employed to determine the cam angle at which the Strobolux flashes. This is accomplished by permitting the Strobotac to flash on the flywheel markings.

Many observations are made possible with this arrangement, namely, the injection lag, duration of injection, beginning and end of injection with respect to the cam position and also the number and duration of pre-injections and secondary injections.

Since many fuel injection equipment combinations are possible much time and expense may be saved in determining pump and nozzle performance as compared with actual engine testing.

(Left) Two views of the stroboscopic testing equipment as set up at the Nordberg plant. Top view shows the fuel pump and injector arrangement, while the lower view shows the flywheel-Strobotac arrangement which enables operator to check injection against degrees of crankshaft rotation.

UNSEEN CLEANLINESS — Where it counts!



SINCLAIR GASCON OIL

Any engine can be *clean looking* on the outside. It is the cleanliness on the *inside*, — the crankcase, valves, and working parts — that is of importance to the engineer.

That's where Sinclair GASCON OILS prove themselves. Inherent properties in GASCON OILS give them natural ability to discourage dirty crankcase accumulations and ring sticking. Efficient high-output operation with GASCON is an established fact in scores of plants.

Let Sinclair engineers show how you can save money with Sinclair GASCON OIL . . . the Diesel lubricant for *inside cleanliness*.

SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

Exchange Your Diesel Maintenance Ideas

Conducted by R. L. GREGORY

Editor's Note: In this department we provide a meeting place where Diesel and Gas engine operators may exchange mutually helpful maintenance experiences to keep our engines in top condition. Mr. Gregory edits your material and adds constructive suggestions from his own wide experience. This is your department—mail your contributions direct to DIESEL PROGRESS.

Solvents Help in Care of Injection Nozzles

THE following letter has been received from C. C. Hilleary, Supt. of the Villisca, Iowa, Municipal plant and we are passing it on to our readers as a suggestion on the maintenance of injection nozzles.

"Some of the boys in our territory have been experiencing trouble with fuel injection nozzles of late, and in my opinion this trouble can be traced to the using of cheaper grades of fuel. Since the price raise in fuels has been in effect, some of the boys have been trying to hold their operating costs down by using cheaper fuels.

"While attending a couple of conventions lately, some of the boys have asked me about my experience with injection nozzle trouble, and I have told them of my experience with using solvents to cure this trouble. I was surprised to find that many of them did not know of this procedure and since it has been a question with many of them I felt that I would pass our experience on.

"About twenty years ago, when high pressure solid injection systems were coming into use, the factory men instructed field engineers never to take a nozzle apart, to send them in to the factory for repair, since the factory contended that no one in the field could repair nozzles and make them operate correctly.

"Having had considerable experience with units before starting my work in the field, I attempted to repair a defective nozzle regardless of the factory say so. After several hours I finally got the nozzle in question to function properly. As time went on, solvents were developed which helped in the conditioning of these nozzles. I tried them out and have found that by following a schedule of operating the nozzle about a thousand hours, then removing same and subjecting them to a solvent treatment on the test stand good results were obtained.

"The solvent cleans the gum and sludge from the nozzle and needle valve and the valve really snaps down on the seat. We have found that where the nozzle is gummed up, the needle valve drags and is slow in returning to its seat, thus causing the nozzle to leak, making a smoky exhaust. This, of course, means a loss of fuel and power. Of course I do not claim this solvent to be a cureall, but many times a leaky nozzle can be remedied by simply pumping solvent through it, thus saving a great deal of time and worry."

The above is just an example of another engineer's method in solving troublesome problems and one which can be applied simply and without a great deal of time and trouble. We all experience such difficulties at times and overcome them. If you have had such experiences send them in and we will pass them on as a means of help to some other engineer.

Cooling Water Arrangement

With the advent of summer and warmer weather conditions, the problem of cooling the engine and lube oil by means of the heat exchangers sometimes becomes quite aggravating. This is particularly true in plants where the cooling agent is taken from a lake or pond which has no circulation and where the water from such a source is vitally affected by weather conditions. During long periods of drought and prolonged periods of hot weather, the temperature in many such lakes and ponds oftentimes reaches as high as 80° F. And 80 degree cooling water will always present a problem, especially when units are operating under heavy loads.

Of course the ideal condition for a cooling water supply, is to obtain the water from deep wells, a flowing stream, or the use of a cooling tower where water is aerated.

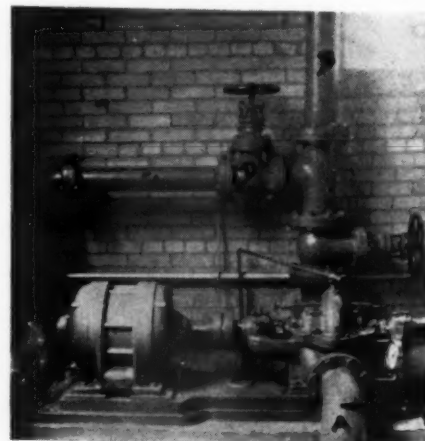
Regardless of the source of the cooling agent, one practice should always be followed out, that of having two sources of cooling agent. In the accompanying cut, the pipe marked "A" is the suction line for the pump supplying the cooling agent to the heat exchangers. Pipe "B" is the discharge line running direct to the heat exchangers. This pump is equipped with a valve directly on the discharge line and directly above this valve a tee has been placed. The

line marked "C" is a connection directly off the city water main. If for any reason, this pump should fail to function properly, the valve in line "B" can be closed and the valve "D" in line "C" can be opened and city water forced directly through the heat exchangers, without any noticeable rise in temperature during the changeover, as the sources of the water for both suction line of the cooling water pump and the city water supply comes from the same wells. In this instance these wells are open wells or supply tanks fed by intake pipes direct from a nearby lake, the water flowing into them by gravity from the lake. This arrangement assures two sources of supply for cooling purpose.

In many cases plants are equipped with a dual pumping system, so that if one pump fails the other is always available. This too is a good idea but more expensive as to first cost and not anymore effective in results.

Getting back to the problem of cooling agent, many plants prefer this source to come from

Photograph of cooling arrangement for standby service. Two sources of cooling water should always be available.



deep well pumps, since the variation in temperature between the hottest summer days and the coldest winter days of this water is no where near as great as it is when the supply comes from a lake, or pond, especially if said lake or pond happens to be rather shallow. At any rate two sources of cooling water are always good insurance and desirable, and the above arrangement is a simple method of installing such a system.

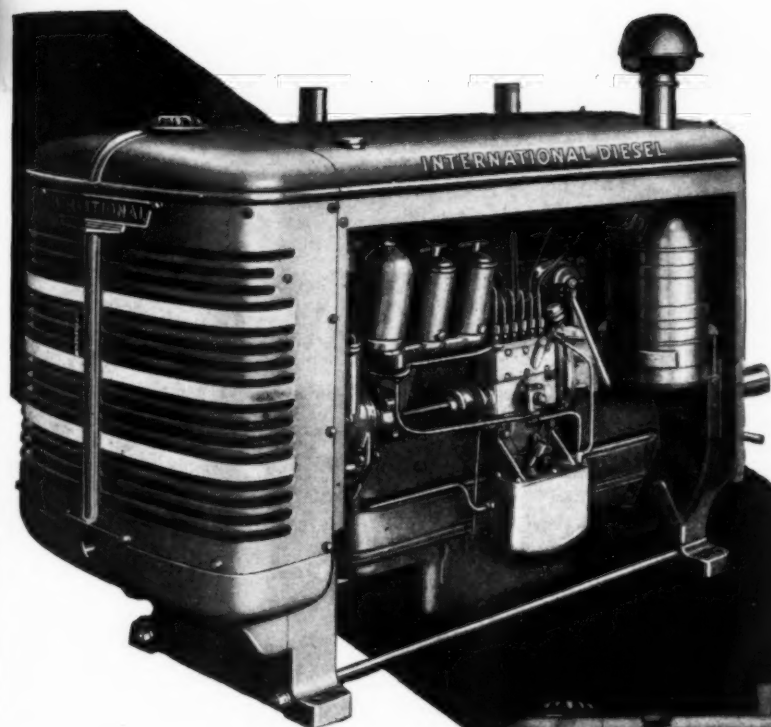
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The International UD-18 Diesel Power Unit, complete and ready for use. It is a 6-cylinder, full-Diesel, valve-in-head engine of 691.1 cu. in. piston displacement.

INTERNATIONAL FEATURES →

The sectional view of the UD-18 shows typical International Diesel Features, such as: Replaceable cylinders, full-floating piston pins, Tocco-hardened crankshaft, precision type bearings, gear-type pump supplying oil through drilled passages to all engine parts, thermostatically controlled by-pass type cooling and over-center clutch which locks in or out of engagement.

HERE'S smooth-flowing power that responds instantly to load variations—power that lugs through when the load gets heavy—power that remains steady and dependable under fluctuating demands.

Yes, International Diesels give you that kind of performance, at new low cost, because advance-design fuel injection, sensitive governors and exclusive feature combinations assure it.

Low operating and maintenance costs are secured with sturdy construction, complete fuel utilization and replaceable wearing parts such as cylinders and bearings, for example.

Even the rated horsepower is dependable because International horsepower is effective *working horsepower* and not simply a laboratory rating!

For full-Diesel performance and economy, use International Diesels for power. Specifications of all models will be sent on request. Let us know your requirements so that we may make suggestions for adapting Internationals to your needs.

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue

Chicago 1, Illinois

Tune in "Harvest of Stars" every Sunday, NBC Network. See newspapers for time and station.

INTERNATIONAL



Industrial Power

SOUTHERN RAILROAD GOES DIESEL

A NEW era in railroading became a reality recently when the Atlantic & East Carolina Railway, only 94 miles in length, became the first American short line railroad to use mainline Diesel locomotives. Railroad executives attending inaugural ceremonies both at New Bern and Morehead City predicted the ultimate extension of mainline Diesel operation to scores of other American short line railroads throughout the country.

They pointed out that hundreds of small farming and manufacturing communities would be benefited and made to prosper, because cheaper operating costs with Diesel power would enable many short line railroads to better their services to shippers and passengers and show profits instead of losses.

The two 1,350 horsepower mainline General Motors Diesel locomotives placed in service today, plus another 1,000 hp. GM mainline locomotive to be delivered later in the year, will completely Dieselize the freight and passenger operations of the Atlantic & East Carolina Railway, and will replace seven steam locomotives of ancient vintage. The new Diesels are versatile enough to handle trains in regular

service and also do all necessary switching at terminals and at stops enroute. Additional

passenger coaches will soon augment the new motive power equipment.



One of the three new General Motors Diesel locomotives used to replace seven steam locomotives of ancient vintage.

HERE'S LOW COST INSURANCE



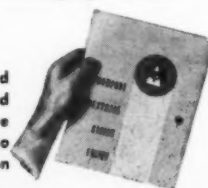
AGAINST COSTLY DIESEL REPAIRS!

A single connecting rod bolt failure can cost thousands of dollars in engine repair . . . can even mean complete loss of the entire engine investment . . .

But you can economically insure against such costs by safeguarding your diesels with Thompson forged steel Connecting Rod Bolts. These precision parts are more than mere bolts. They are carefully and accurately forged, heat treated and finished to the highest quality standards. They have greater strength, better fatigue resistance, higher uniformity and closer finish

to meet the hardest kind of diesel service . . . to insure perfect alignment and eliminate damaging stresses that might result in bolt failure.

Full details on Thompson Connecting Rod Bolts—now being adopted as standard equipment by diesel manufacturers—are yours for the asking. Write—and ask also for your copy of the Thompson booklet on Industrial Engine Valves.





Thompson Products, Inc.

WEST COAST PLANT • BELL, CALIFORNIA

Santa Fe: Continued from page 43

of the dynamic brake, a novel, very economical way of adding comfort to passenger train handling and the means of big savings on brake shoes and wheels. The Santa Fe pioneered the dynamic brake on freight; now it goes into the use of this brake on passenger operation in a large way. It remains for the Diesel locomotive people to start using this wasted energy from downwill regenerative braking, by experimenting on one of two paths: Either utilize this energy to substitute for some oil burned in heating boilers or tie in the regenerative circuit into the engine room auxiliary circuit and thereby temporarily decreasing the parasite auxiliary load on the main Diesel generating set. Again the Santa Fe offers unusual laboratory facilities, for it is the country's biggest user of steam-jet air conditioning—using boiler steam to cool in summer and heat the train in winter!

Erie R. R. Orders 23 Diesel Locomotives

A TOTAL of 23 more Diesel locomotives are being ordered by the Erie Railroad, R. E. Woodruff, President, announced recently. Three of the Diesels will be of the giant four-unit type, 6,000 horsepower freight locomotives. They will be used as an addition to the fleet of six 5400 horsepower Diesels already operating which the Erie purchased about a year and a half ago.

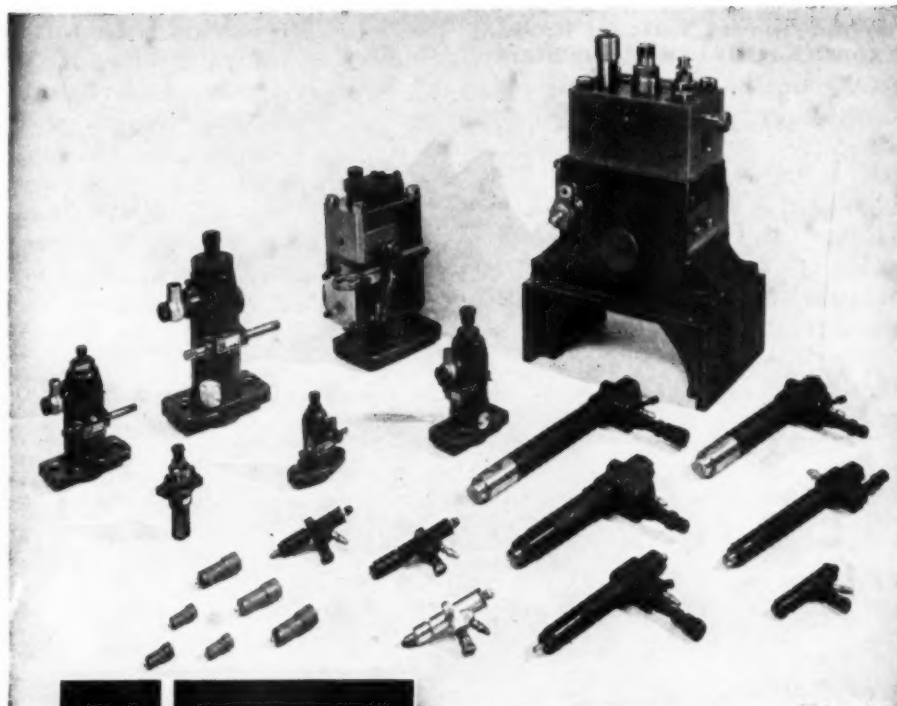
The freight locomotives will be built by the Electro-Motive Division of General Motors Corporation, and delivery is expected about the second quarter of 1947.

The balance of the Diesels will be twenty switching locomotives of which 11 will be 1000 hp., eight 660 hp. and one 380 hp. Delivery is expected during the last quarter of 1946. They will be assigned to freight switching terminals at various points along the line.

Outlook: Continued from page 73

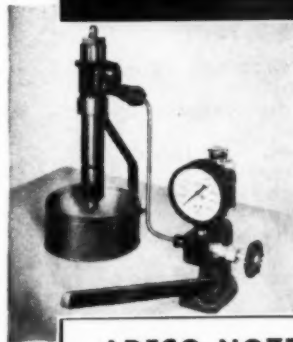
8. There is reason to believe that the Diesel engine will be used in small airplanes very soon. Developments are underway which indicate the successful development of a radial air-cooled aircraft Diesel.

He has had a great deal of experience abroad where he was able to secure data and information not heretofore available. He reviewed the important factor in global utilization of the Diesel by the Army and Navy, and this will be greater than ever before. From a high pinnacle of wide and extensive experience, he has ably evaluated those factors which concern the development of the Diesel engine.



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YOUR SOURCE FOR DEPENDABLE FUEL INJECTION EQUIPMENT



ADECO NOZZLE TESTER For Low-Cost Maintenance

America's most widely used nozzle tester enables any mechanic to make quick, accurate tests on injector opening pressure, spray pattern, etc., and detect stuck needle valves and leakage around valve seats. Compact, portable, sturdy, precision-built. Pressures up to 10,000 p.s.i. Tests both large and small injectors on bench or engine. Prevents costly delays and possible damage to engine. Standard or Navy-approved gauge. Ideal for testing hydraulic equipment. Write for bulletin.

Whether you need standard fuel injection equipment or special units built to your specifications, Adeco offers the logical source of supply.

Today's line of Adeco equipment, the outgrowth of long experience in serving the Diesel industry, includes: Standard fuel injection pumps in plunger diameters from 7 mm. to 31 mm.; a complete line of standard nozzles and nozzle holders, including the water-cooled type; and the Adeco nozzle tester.

All Adeco products are built to highest standards, with years of trouble-free operation behind them to testify to their reliability.



AIRCRAFT & DIESEL EQUIPMENT CORP.
4401 NO. RAVENSWOOD AVE. • CHICAGO 40, ILLINOIS

Second Annual National Marine Exposition Off to a Flying Start

PLANS are now well under way for the Second Annual National Marine Exposition which will be held in the Civic Auditorium, San Francisco, the week of May 12-17, 1947. This exposition, like the highly successful Marine Show in New York this year, will again be sponsored by The Propeller Club of the United States, and under the management of National Marine Expositions, Inc.

The satisfaction of exhibitors at the New York

Exposition is evidenced in the fact that on the closing day, May 25 of this year, sixteen of the major exhibitors contracted for over 10,000 square feet of space in the 1947 Exposition. Although the company's nation-wide space allotment campaign has not yet been inaugurated, many requests for space and inquiries have been received from prominent concerns in the marine industry which are anxious to secure the locations best adapted to their particular requirements.

Roger E. Montgomery, President and General

Manager, has announced that a large section of the main floor of the 1947 Exposition will be devoted to the display of motor boats, pleasure craft and accessories. The 1946 Show in New York did not include pleasure craft because of possible conflict with the National Motor Boat Show which, previous to World War II, was held annually in that city and is expected to resume next year.

Pacific coast offices of National Marine Expositions, Inc., have been established at 3211 Ibsen Street, San Diego, Calif., while headquarters of the company will be retained at 17 Battery Place, New York 4, N. Y.

The Marine Exposition Advisory Committee will be comprised of the same well-known marine industry executives who served for the 1946 Exposition: Chairman, Arthur M. Tode, Honorary President of the Propeller Club of the United States; Harold J. Harding, National Secretary; Benn Barber, Waterman Steamship Agency; C. W. Bryan, Jr., Federal Shipbuilding and Dry Dock Co.; John F. Gehan, American Export Lines, Inc.; Harmon Lewis, Alcoa Steamship Company; J. Lewis Luckenbach, American Bureau of Shipping; Henry F. Markwalter, Luckenbach Steamship Co., Inc.; Lewis D. Parmelee, AGWI Lines, Inc.; Henry Reed, Insurance Company of North America; and O. B. Whitaker, Sperry Gyroscope Company.

This will be the first National Marine Exposition ever to be held in any Pacific Coast City. The remarkable progress of the west coast ports and industrial centers during recent years, and the important part played by them in maritime affairs, make the selection of San Francisco in 1947 a highly logical sequence.

Alco-General Electric Railroad Film Available For Group Showings

WITH 121 prints of the 16 mm, full-color Alco-G.E. film, "Railroadin'" now available, so great has been the demand that forty new copies are being prepared for release. This stirring saga of our nation's railroad progress has been shown to over seventeen thousand different audiences. Since October, 1941, nearly two million people have seen this thirty minute show.

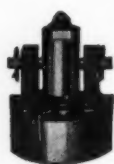
"Railroadin'" is available to organized groups such as educational institutions, churches, and civic, social, and business organizations. Films for exhibition in the United States are free on request to the General Electric Company, although the exhibitor pays transportation charges.

LET US SEND YOU

the Story of

"\$75,000.00

...that didn't go up in smoke"



One of the many leading railroads having installed the Bearing Watchdog System in its Diesel locomotives recently reported savings of more than \$75,000.00 in maintenance and repairs credited to the system. This report is presented in a folder titled "75 Thousand Dollars That Didn't Go Up In Smoke." It outlines briefly how you, too, can cut Diesel maintenance and repair costs. We'd like to send the folder to you free, without obligation on your part.

paxton
DIESEL ENGINEERING COMPANY
OMAHA 5, NEBRASKA

Mail this coupon today for free folder

GET THE DETAILS

on the Bearing
Watchdog System—
Crankshaft Protector

Paxton Diesel Engineering Co.
Omaha, Nebraska

Please send me the new folder on the Bearing Watchdog System, titled "75 Thousand Dollars That Didn't Go Up In Smoke."

NAME
ADDRESS
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FIRM POSITION

Gregory New Air

W.M. K. C. key executi filter comp of Contine Ky.

Continental company in to industria cial empha gas engines is nearing ville, Ky.

Directors of Fred D. D. Manufactur President of Shouse, of Gregory. C. dent; J. Marshall, Treasurer.

Consolidated George

GEORGE Board of t Sons, 30 P elected tru ing Corpor Mr. Roose New York tified with of special Shipbuildi 1885 and Jacob ship Sound.

Gregory, President of New Air Filter Company

WM. K. GREGORY, for twenty-two years a key executive in one of the nation's largest air filter companies, has been elected President of Continental Air Filters, Inc., of Louisville, Ky.



Wm. K. Gregory

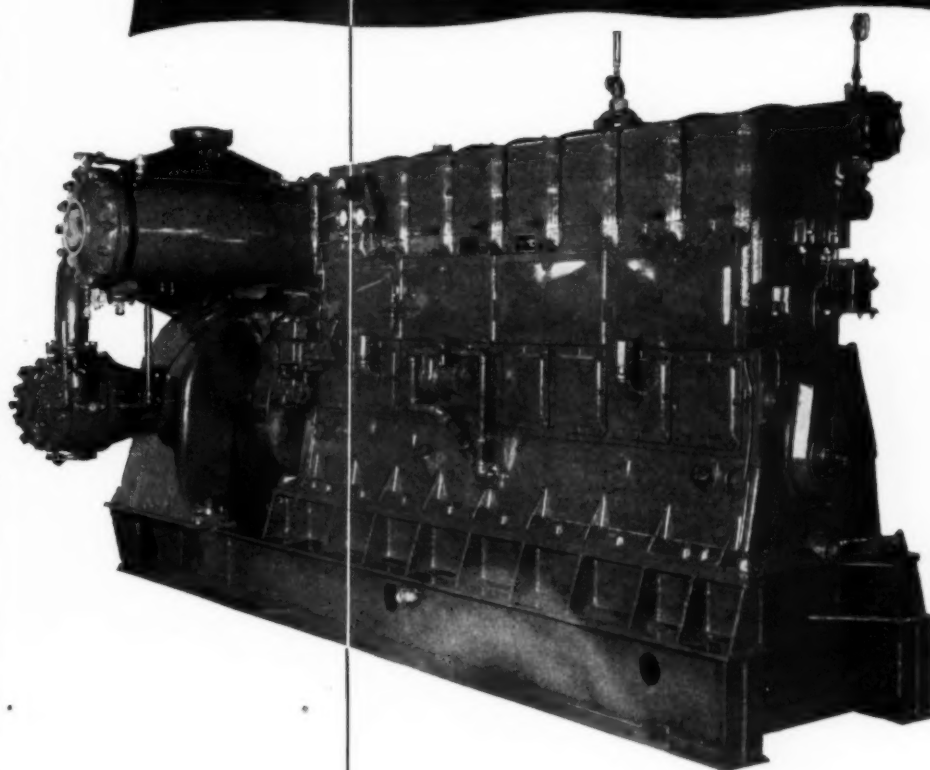
Continental Air Filters, Inc., a relatively new company in the air-filtration field, devotes itself to industrial air filters and cleaners, with especial emphasis on air cleaners for Diesel and gas engines and air compressors. A new factory is nearing completion, at 2550 Helm St., Louisville, Ky.

Directors of Continental Air Filters, Inc., are Fred D. Durham, President of C. Lee Cook Manufacturing Co.; Raymond Deateale, Vice President of Glenmore Distilleries Co.; J. F. Shouse, of J. F. Shouse & Co.; and Wm. K. Gregory. Officers are Wm. K. Gregory, President; J. F. Shouse, Vice President; John Marshall, Jr., Secretary; Hugh M. Rose, Treasurer.

Consolidated Ship Elects George E. Roosevelt Trustee

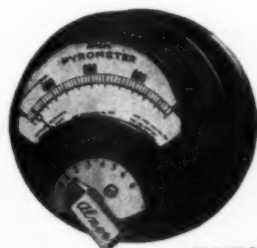
GEORGE E. ROOSEVELT, Chairman of the Board of the banking house of Roosevelt and Sons, 30 Pine Street, New York, was recently elected trustee of the Consolidated Shipbuilding Corporation, Morris Heights, New York. Mr. Roosevelt is an ex-Commodore of the New York Yacht Club and has long been identified with yacht racing and the establishment of special classed boats. The Consolidated Shipbuilding Corporation was established in 1885 and has recently acquired the Robert Jacob shipyard at City Island on Long Island Sound.

guide to dependable engine performance



This Atlas Imperial 8 Cylinder Diesel is equipped with an Alnor Exhaust Pyrometer, giving a reliable guide to efficient engine performance. The importance of exhaust temperatures is universally recognized, and this dependable instrument provides a convenient means of securing an accurate record. Atlas Imperial is one of the many famous engine builders using Alnor Pyrometers for this vital service. There is an Alnor Pyrometer to meet the needs of any Diesel engine, large or small, afloat or ashore. Write for bulletins describing the complete line.

TYPE AX PYROMETER



ILLINOIS TESTING LABORATORIES, INC.
420 N. LA SALLE STREET • CHICAGO 10, ILLINOIS

Technical Crafts Corporation Acquires Hemphill Diesel Schools

TECHNICAL Crafts Corporation, Los Angeles, announces the acquisition of the Hemphill Diesel schools of New York, Chicago, Memphis and Los Angeles and the Plastics Industries Technical Institutes of New York, Chicago and Los Angeles.

The move will bring these institutions under the same corporate head with Aero Industries Technical Institute, Oakland; the American

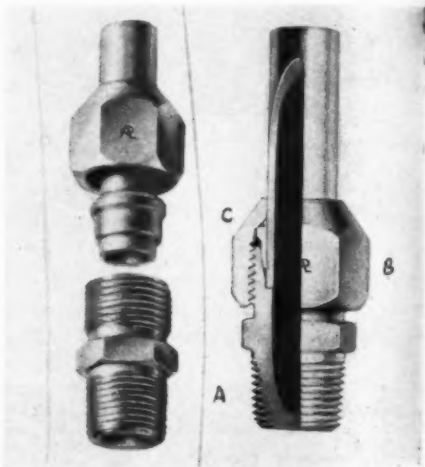
Schools of Watchmaking and Aircraft Instruments, Los Angeles; General Trades Schools, Los Angeles; and the Airtronics Manufacturing Company, Los Angeles.

Expansion in many fields is planned, it was announced, and offices are to be opened in Latin-American and other foreign countries. With the exception of Airtronics, which manufactures pre-heaters for plastics, the institutions provide both residential and home study training in a wide variety of fields.

Ralph Hemphill will serve as president and chairman of the board with O. D. McKenzie, Carl H. Arbenz and Roy Hemphill as vice presidents. Headquarters in Los Angeles.

Parker Develops Flareless Fitting

THE Parker Appliance Company, Cleveland, recently announced the development of a new fitting for use in joining all types of metal tubing, including 1/4 hard stainless steel, in hydraulic and fluid-conveying systems. Eliminating the need for special flaring and assembly tools, brazing or soldering, the new fitting incorporates a steel ferrule which, when body and enclosing nut are tightened up, acts to cut a shoulder in the tubing itself, thus providing a strong, tight sealing grasp for the assembly. The new fitting is expected to be particularly useful in high-pressure applications and in installations where thick wall tubing is used.



Two views of Ferulok tube coupling.

In the accompanying cross section, the arrangement which produces the cutting action can be seen. When the body "A" and the nut "B" are tightened, the confined ferrule "C" is forced forward. The cone angle of the body contacts the ferrule, and directs its sharp forward edge downward. Further tightening at specified torques forces the ferrule into the tube, casting up a shoulder to resist pull-out when pressure is applied in the system. Meanwhile, a second grip has been generated at the rear of the ferrule, for the dampening of possible vibration in the system.

The new fittings will be available initially in 1/4 in.—1 in. O.D. tube sizes, in all conventional shapes and materials, the fittings will be threaded identically in size and pitch with the corresponding flared fitting. For further details write The Parker Appliance Co., Cleveland, Ohio.

it takes a
CLEAN ENGINE
to deliver
FULL POWER

TO CLEAN OUT THE ENGINE

TO KEEP IT CLEAN

All manufacturers' performance ratings are based on clean engines. A dirty engine cannot produce the power built into it because sludge, gum and acid accumulations create abnormal conditions and "foul up" working parts.

LOOSITE, a basic cleaner, rids the engine of all sludge and gum. It reaches valves, rings and pistons; restores their real efficiency. It is safe, easy and economical to use.

After one **LOOSITE** treatment, a can of **SILOO** added with each change of crankcase oil, keeps your engine clean by dissolving immediately any new sludge formations. **SILOO**, the seven-solvent compound with four inhibitors, becomes an integral part of the lubricant itself—cannot be removed by any standard filter. This is important.

A **LOOSITE-SILOO** treatment will show immediate results on any type Diesel or gas engine. Fifteen years of service to Diesel experts endorses its use.

SOLVENTS FOR ALL TYPES OF PETROLEUM RESIDUES
Petroleum Solvents
CORPORATION

General Offices: 331 Madison Avenue, New York 17, N.Y.
Plant and Laboratories: Port Reading, New Jersey

Petroleum Solvents Corp., of Canada, Ltd.,
Dominion Square Bldg., Montreal

If you heat with oil—
write for information
on **SILOO FUEL OIL**
TANK SOLVENT

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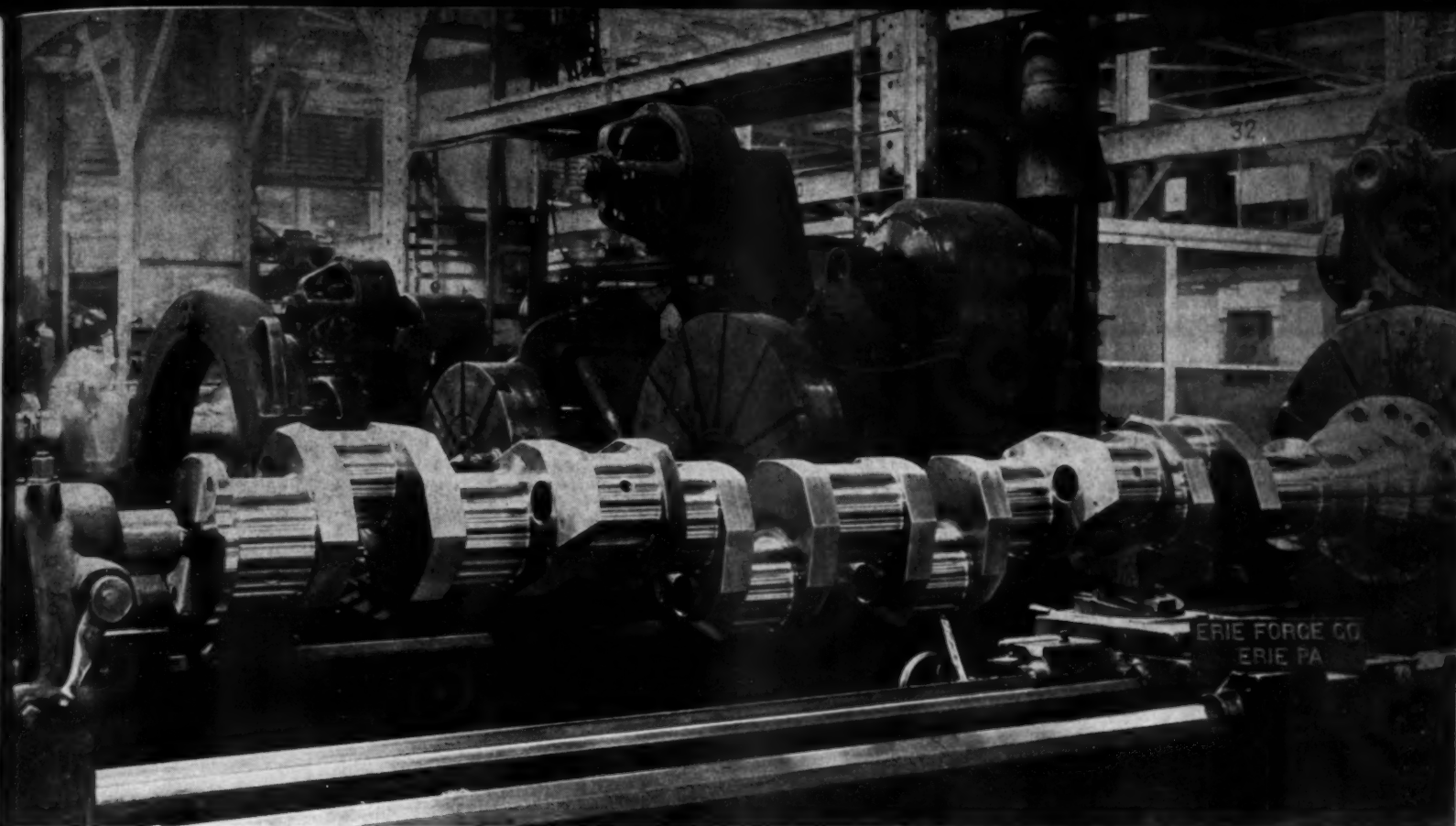
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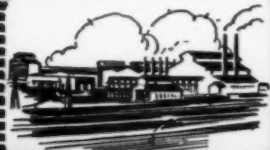


View in Erie Forge Shop showing finished crankshaft for six-cylinder Diesel.

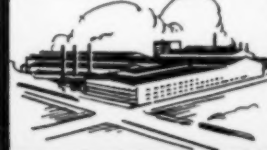
SHAFTING

**for
AMERICA'S
DIESELS**

From start to finish, the manufacture of Diesel shafting in Erie Forge shops remains under constant control of one responsible, experienced organization. That is positive assurance of excellence in material and workmanship — that is the reason Erie Forge shafting is specified for America's Diesels.



ERIE FORGE COMPANY, ERIE, PA.



Briggs Bulletins Describe Complete Line of Filters

SIX new bulletins are offered by the Briggs Filtration Company which cover the filtration of fuel and lubricating oils as well as hydraulic and insulating oils. The remaining two bulletins describe filtering units for coolants and filter refills for the various filtration systems.

The most interesting of these bulletins to the reader of this magazine is the one devoted to lubricating oil filters for internal combustion

engines. Complete with charts and tables, this bulletin provides an excellent guide for lubrication. It includes information on the selection of the proper size filter, filter specifications, installation diagrams, and a standard Viscosity-Temperature Chart.

The bulletin covering fuel oil filters describes Briggs Z series unit together with proper installation and maintenance procedure. The bulletin which describes filter refills enumerates the various types offered by the company. These

include Adsorptive type refills, which include an adsorptive medium such as fullers earth, bauxite, or alumina, with cellulose; Fibrous Cellulose refills, for heavy duty oils; and the strainer type refills for low viscosity liquids.

These bulletins may be had upon request by writing the Briggs Filtration Company, Bethesda 14, Maryland.

Battery Charger Has Automatic Amperage Control

A NEW battery charger by the Mellaphone Corporation operating on 110 volts, 50/60 cycle AC current, utilizes a tapering charging rate for longer battery life. The initial charge of 8 amps is automatically reduced to 3 amps as the battery approaches full charge. Rated at 6 amps the charger will take an overload of 50%. There are no moving parts or tubes and operation is noiseless. The charger comes complete with cords, clips, and plug, ready to use. It is fused for protection against faulty batteries. Further information may be obtained by writing the Mellaphone Corporation, Rochester 2, New York.

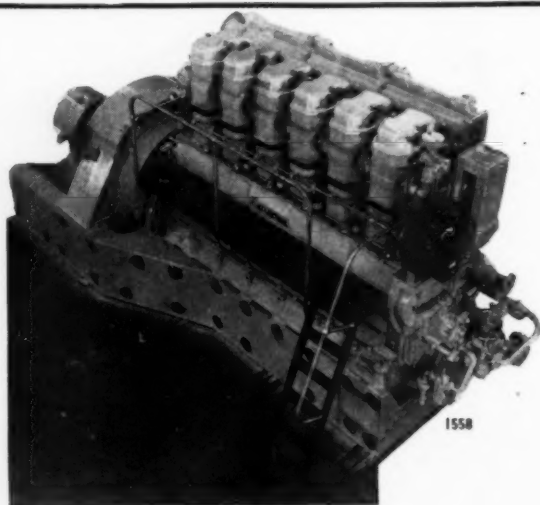


Mellaphone Electronic Rectifier

90% of New Tractors Have Electric Starting

MORE than 90 per cent of all tractors currently being manufactured are equipped with electric starting and lighting, according to Royce G. Martin, President of The Electric Auto-Lite Company, manufacturers of such equipment.

"This turn to electric starting and lighting," Mr. Martin said, "has been recent, its advantages definitely being proven during the war. In 1940 few tractors had electric equipment with the demand coming from purchasers practically over-night."



93,780 DIESEL HORSE POWER—IMMEDIATE SHIPMENT

MARINE DIESEL—ELECTRIC UNITS—COMPLETE—1944 GENERAL MOTORS DIESELS—ALLIS CHALMERS—WESTINGHOUSE ELECTRICAL EQUIPMENT

6400 H.P. FOUR ENGINE UNIT—TWIN SCREW
3200 H.P. TWO ENGINE UNIT—SINGLE/TWIN SCREW
1600 H.P. SINGLE ENGINE UNIT—SINGLE SCREW

ENGINES, GENERATORS, PROPULSION MOTORS, CONTROLS, TAIL SHAFTS, BEARINGS, THRUSTS AND PROPELLORS.

A.C. DIESEL GENERATOR UNITS—60 CYCLE—50 CYCLE

	KVA	H.P.	MAKE	RPM
	2—1875	2000	FAIRBANKS	300
	1—1250	1500	NELSECO	300
	10—1250	1600	GEN. MOTORS	720
	4—1000	1200	GEN. MOTORS	600
Sold—	1—625	750	SUPERIOR	327
	3—625	750	GEN. MOTORS	720
	5—375	450	GEN. MOTORS	600
	2—375	450	ALCO (MACK)	340
	1—375	450	ENTERPRISE	450
	1—300	360	FAIRBANKS	257
	5—250	300	GEN. MOTORS	900
	4—250	400	GEN. MOTORS	1200
	2—200	240	FAIRBANKS	257
	1—154	190	BUCKEYE	514
	2—127.5	165	MURPHY	1200
	4—125	150	GEN. MOTORS	1200
	1—92.5	112.5	BUCKEYE	400
	10—75	90	GEN. MOTORS	1200
	15—62.5	80	INTERNATIONAL	1200
30—37.5	60	INTERNATIONAL	1200	
28—18.75	38	INTERNATIONAL	1200	

D.C. DIESEL GENERATOR UNITS—2 WIRE—3 WIRE

KW	H.P.	MAKE	RPM
12-1000	1400	GEN. MOTORS	750
2-800	1250	McINTOSH-SEY.	250
3-500	750	GEN. MOTORS	750
3-300	450	GEN. MOTORS	600
1-300	450	GEN. MOTORS	1200
6-275	440	COOPER BESS.	800
3-250	450	ENTERPRISE	450
4-250	450	WORTHINGTON	450
4-100	150	SUPERIOR	1200

SMALLER UNITS TO 10 KW

SMALLER UNITS TO 10 KW

PORTABLE POWER UNITS—15 H.P. to 400 H.P. RADIATOR COOLED—WITH CLUTCH POWER TAKE OFF

WHAT ARE YOUR REQUIREMENTS?

A. G. SCHOONMAKER COMPANY

BUSINESS ESTABLISHED 1898

ENGINEERING—DIESEL ENGINES—SALES

50 CHURCH STREET • PHONE WOrth 2-0455 • NEW YORK 7, N. Y.

Cable Address: AGSCOMACH

Shops & Warehouses, Jersey City, N. J.

11th Edition of the Diesel Engine Catalog Just Off the Press

A NEW, completely revised edition of the DIESEL ENGINE CATALOG just came off the press and is now available. This—the first post-war edition of the Catalog reflects sweeping changes in engines and Diesel plant equipment, with many new engine models added. Each engine builder's line is described in detail and illustrated—fuel, lube and cooling systems are traced in color. Over 500 pages packed with valuable information—four sections including the Diesel Engine section, Accessory section, The Market Place—a directory of engines and accessories, and an advertising section. The Catalog embodies the entire Diesel industry under one cover—an indispensable book for design, operating and consulting engineers, sales executives and sales engineers, schools, libraries, in fact for all interested in Diesels. First printing limited so order your copy today. Price \$10.00. Use the convenient order coupon on page 103 of this issue of DIESEL PROGRESS.

Enterprise Appoints Belilove



Saul Belilove

ENTERPRISE Engine and Foundry Company announced recently the addition of Saul Belilove to the sales department of the company's Diesel Engine Division. Mr. Belilove formerly headed the Application Section of the Enterprise Engineering Department.

A graduate of Brown University, he also holds a master's degree in Diesel Engineering at Pennsylvania State College. Belilove came to Enterprise from Boeing Aircraft Company in Seattle.

Diesel Plants Utilizing Surface Armor for Heavy Floor Service

RECENT installation of Klemp Hexsteel, heavy duty surface armor, by large Diesel engine plants, as flooring for severe requirements, is another tribute to the special qualities of Hexsteel. Hexsteel is a heavy duty steel grid, scientifically designed to be imbedded in concrete, or mastic, or any plastic floor material. When so imbedded it makes a solid, one-piece, rigid, level and seamless mat in the entire surface. The steel tops of the mesh are exposed.

The dropping of heavy material does not affect Hexsteel floor. Chipping, cracking, creeping, splintering, spalling, are practically eliminated. Ruts and pot-holes do not form.

Concrete or mastic is floated flush with the top surface of the Hexsteel grid, and may be steel-trowled, or if cold mastic, tamped and rolled.

Full information with engineering and application data may be had by addressing the manufacturer, Wm. F. Klemp Company, 6601 S. Melvina Ave., Chicago 38, Illinois.

• BUCKEYE DIESELS •

Always

DEPENDABLE

"BE PROFIT-WISE
AND DIESELIZE WITH BUCKEYES". . .

NAVIGATORS know that a compass is **DEPENDABLE** for guidance. North is *always* **NORTH**.

Buckeye Diesels give their owners that kind of dependability, too. The name "Buckeye" on an engine has been the symbol of **DEPENDABLE POWER** ever since 1908—always a proved guide to **DIESEL ECONOMY**.

Every feature of Buckeye design and construction has been developed to bring greater dependability and economy to users of Diesel power. For example: No bolts, studs, cap

screws or gaskets are used to secure the exhaust and air manifolds to the cylinder heads. This is an exclusive Buckeye feature which, by making cylinder heads easily removable, eliminates valve cages. As a result, valve areas are larger and combustion efficiency is increased by providing unrestricted air flow and quicker expulsion of gases.

Stationary Engines 150-1440 H.P.
Diesel Generator Sets 100-1000 KW.

WRITE TODAY for your Buckeye bulletins. Place your order **NOW** for early delivery.

THE BUCKEYE MACHINE COMPANY, LIMA, OHIO

• ENGINE BUILDERS SINCE 1908 •

New, Improved Oil Filters

INCREASE DIESEL ENGINE EFFICIENCY

PROPER LUBRICATION IS ESSENTIAL

In these days of parts shortages, the value of proper lubrication for Diesel engine maintenance is self-evident. The sulphur and other elements contained in Diesel fuel forms carbon and soot—contaminants which pollute the delicate film of the crankcase oil, resulting in abrasive friction. No one additive or detergent compound can correct all these contaminating conditions. But actual test runs and field operations have proven that SUN Oil Filters keep crankcase oil 90% clean!

FULLER'S EARTH BEST FILTER MEDIUM

The manufacturers of SUN Oil Filters decided upon fuller's earth, screened and properly compounded, as the only medium that will filter oil clean. The ordinary type filter employs wood fiber, paper, rags or waste, which act as strainers only; whereas the SUN Oil Filter absorbs gases and traps all non-lubricating elements. There is nothing in fuller's earth to affect the oil itself, and there is no way in which it can enter the engine from a SUN Oil Filter pack.

WRITE, PHONE OR WIRE FOR COMPLETE INFORMATION

SUN OIL FILTER

W. L. Clay, Manufacturer & Distributor

1529 W. MAIN ST.

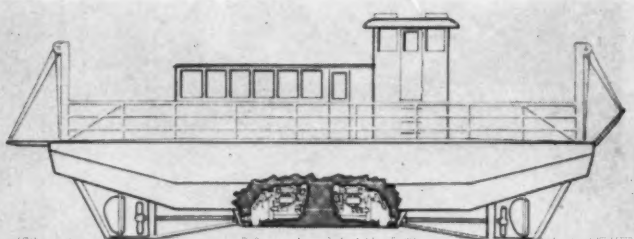
OKLAHOMA CITY, OKLA.



No. 10-46 DIESEL FUEL
Manufactured for All Sizes
of Diesel Engines.



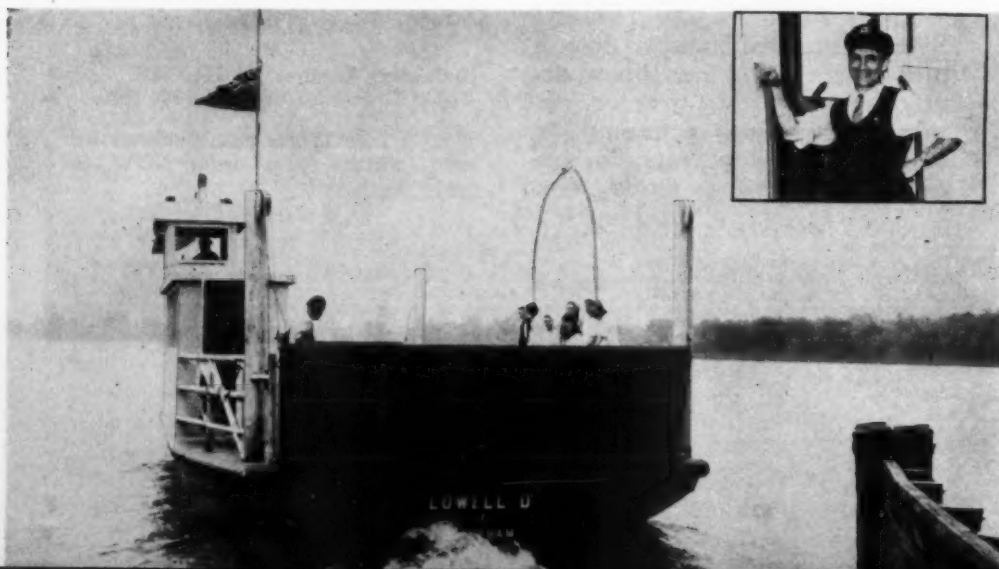
No. 12-45 DUAL FLOW
Manufactured for All Sizes
of Diesel Engines.



Two 4-cylinder General Motors Diesels are installed. The top boat speed on one engine is about 12 mph. The 2-cycle, 110 hp. engines are operated alternately.

MIDGET FERRY

(Insert) Captain M. S. Dalgety, owner and operator of the "Lowell D." The Midget Ferry returning from a short trip on the St. Clair River.



CONSTRUCTED along the general lines of an aircraft carrier, the new ferry boat *Lowell D* which makes about thirty trips daily between Algonac, Michigan and Walpole Island, Ontario has many features of interest to vacationists, commuters and boat owners alike.

The *Lowell D* has a capacity of six automobiles and cabin space for some thirty foot-passengers besides. She makes the crossing of over a mile in about five minutes.

Of all steel construction, the boat has 5/16 in. plating on hull and deck, with additional 1/4 in. plating reinforcing chines and bows for ice-breaking. She is a double-ender with "Vee" bottom and squared bows; overall dimensions 52 ft. by 20 ft.; 5 ft. draft. For safety against collision ten watertight compartments completely surround the central or engine-room section of the hull.

Built by Erieau Shipbuilding and Drydock Company at Erieau, Ontario, the ferry was fitted with General Motors Diesel Marine engines by Goodison, Ltd., of Blenheim.

The *Lowell D* is powered by two General Motors Series 71 4-cylinder Diesels with 3:1 ratio reverse and reduction gears, swinging 36 by 28-inch 3-bladed propellers. Keel cooling is utilized. Top boat speed on one engine is about 12 mph.

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SEPTEMBER



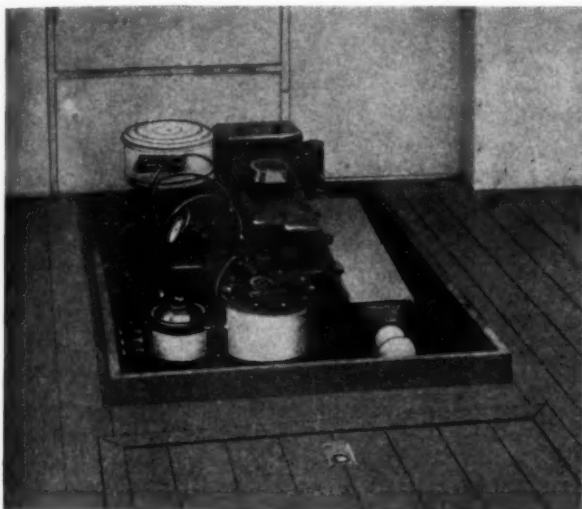
NEW DIESEL FISHERMAN

A 20 PER CENT reduction in fuel costs because of improved hull design alone, is claimed by the builders of this 32 ft. lobster boat. Light in weight without sacrificing strength, the fast, easily-driven hull offers both the commercial fisherman and sportsman a boat

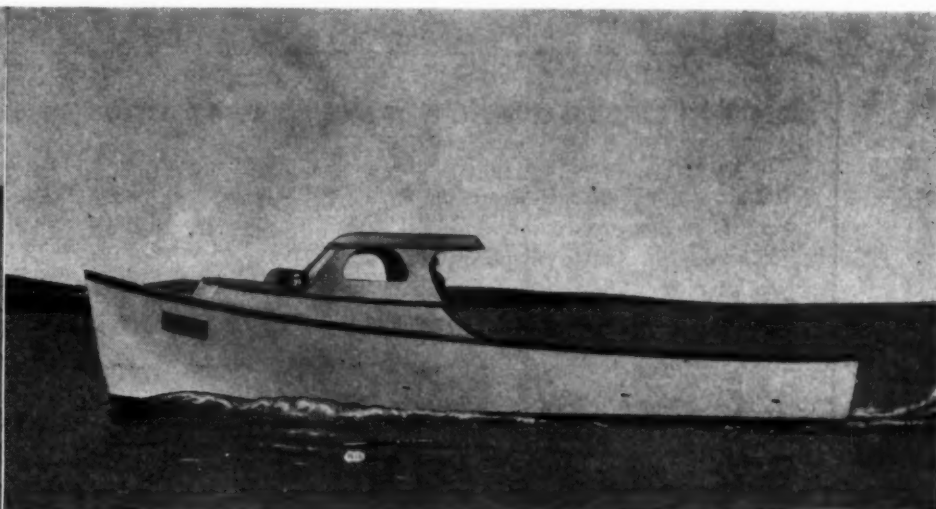
of adequate speed with unusual seagoing ability. 9 ft. beam, 3 ft. 3 in. draft insures stable performance in the roughest water.

In recognition of the trend toward Diesel propulsion because of its safety and economy, this is one of the first small fishing boats to offer

it as standard equipment. Continuous operating speed with its 31 hp. Model 6F Sheppard Diesel turning a 17 x 14 wheel at 1325 rpm. is 11 mph. Fuel costs average about 12 cents per hour at this speed. Although the Sheppard requires no operating adjustments it is easily accessible by removing the engine hatch.



Deck view of 31 hp. Sheppard Diesel installed in new lobster boat.



32 feet in length, this trim craft cruises at 11 mph. at a fuel cost of 12 cents an hour.

**MANY OF THE WORLD'S
FINEST DIESEL ENGINES
ARE FACTORY-EQUIPPED WITH...**

PIERCE GOVERNORS

★ For more than thirty years, Pierce engineers and field representatives have been meeting and solving difficult governing problems—and proving that *good* governing makes money for engine manufacturers and users alike.

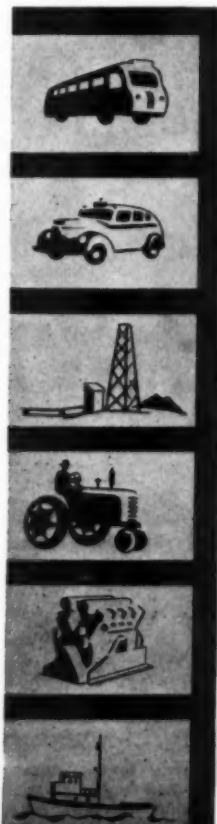
That is the reason that Pierce Governors are standard equipment on many of the world's finest diesel engines—and the reason they are specified by thousands of engine users in all kinds of applications.

Pierce Diesel Governors are available in two general types—and many adaptations. They drive directly from the fuel pump—or independently of the fuel pump shaft. Both types are unsurpassed for accuracy and unfailing dependability—and trouble-free long-life. They often outlast the engines themselves without repair or readjustment. Wherever governing is required, *good* governing is best—and that means Pierce!

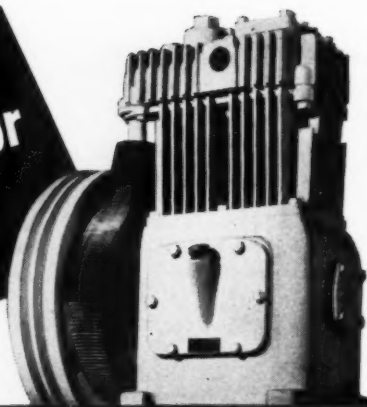


**PIERCE
GOVERNORS**

THE PIERCE GOVERNOR CO., INC. 1603 OHIO AVENUE
ANDERSON, INDIANA
Manufacturers of Pierce Precision Governors and Sisson Automatic Chokes



*the
right compressor
for your job*



Select from most complete line of air compressors 1 TO 80 C.F.M.

The answer to an efficient and economical air supply lies largely in getting the correct size and type compressor for the job. Your problem is simplified when you select from the Quincy line because it is the most complete line from 1 to 80 c.f.m. Each model embodies modern,

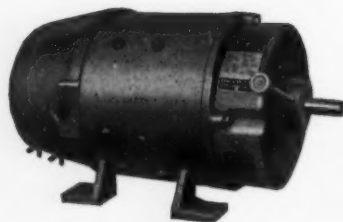
improved design features — both inside and out — that assure *greater overall efficiency*. Air and water-cooled models for intermittent and continuous operation. Wide range of standard and special mountings. Quincy makes air compressors exclusively. Call in a Compressor Specialist from Quincy.

QUINCY COMPRESSOR CO.
Dept. K-96, Quincy, Illinois

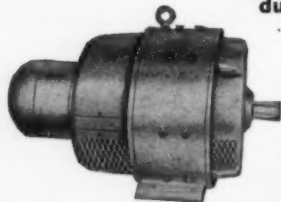
Quincy
COMPRESSORS

BRANCH OFFICES: New York
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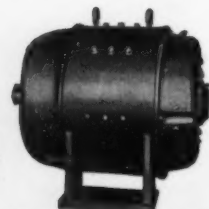
GENERATORS *AC and DC*



Well-known for their rugged design, efficient performance, long life and minimum maintenance, whether powered by electric, gasoline, or Diesel equipment. Backed by over ½ century of manufacturing and designing experience, Kurz and Root generators are now serving industries throughout the world.



Illustrated are AC generators, only 2 of the many different types developed and designed to fit specific needs and applications. (upper left) two-bearing self-excited type; (lower right) two-bearing, direct connected exciter type.



DC generator (left) two-bearing, self-excited type. Can also be

furnished with direct connected exciter. Both AC and DC generators can be furnished in the single bearing, flange-mounted type for special mounting requirements. Ball bearing construction is used throughout. Complete data upon request.



KURZ and ROOT Company

APPLETON • WISCONSIN

..... and 35 motors and motor generator sets

Trotman Heads New Bowser, Inc. Division

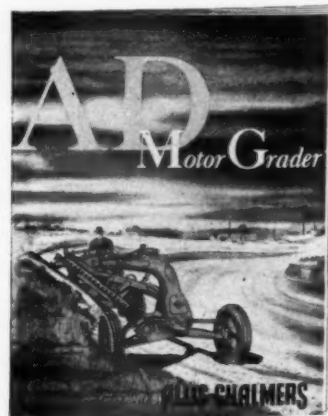


J. B. Trotman

J. B. TROTMAN of Grand Rapids, Michigan, has been appointed head of the new Bowser, Inc., Industrial Pump Division, according to a recent announcement by the company. Mr. Trotman has been identified with the pump industry for thirty years and has been for the past six years General Sales Manager of Blackmer Pump Company, Grand Rapids, Michigan. Headquarters of the new Bowser division will be located in Fort Wayne, Indiana.

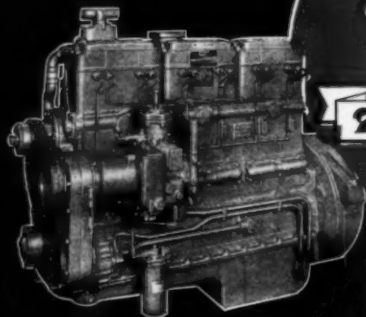
New Allis-Chalmers Catalog

RECENTLY released by the Allis-Chalmers Tractor Division is an attractive 32 page catalog featuring the newly improved AD motor grader. This booklet stresses the capacity, performance and design of the AD, giving special attention to clearance, blade construction and range, electric brakes, sturdy frame and its General Motors 2 cycle, 75 horsepower engine.



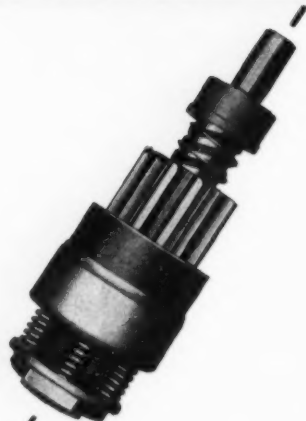
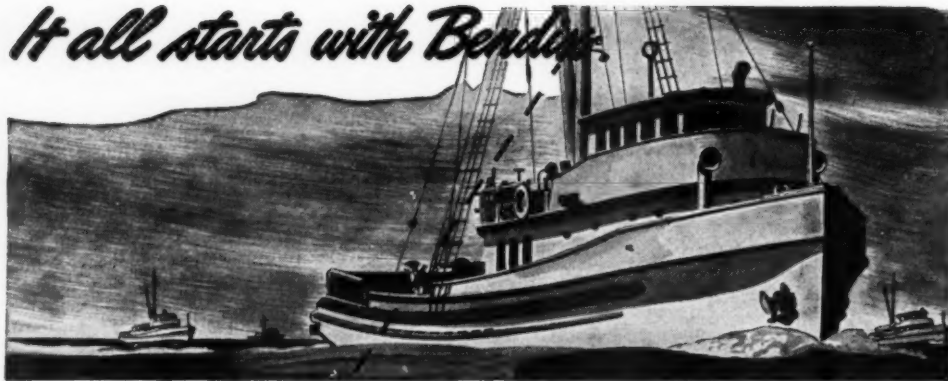
The catalog is available at any Allis-Chalmers crawler tractor dealer or can be obtained by writing to Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee 1, Wisconsin for catalog form No. MS-300A.

Predictable . . .
more profitable work-hours
with a quality-built



CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA

It all starts with Bendix.



Out of touch with land for months at a time, Diesel-powered commercial fishing craft must be "dead sure" of continuous dependable starting.

—and Bendix* Starter Drives provide just that.

Designed and engineered for compactness, ruggedness, universal adaptability, and simplicity of operation, these heavy-duty Drives have a performance-proven record of many years of dependable service on land and sea.

For heavy-duty Starting—marine, automotive and industrial—Bendix is best.

*REG. U. S. PAT. OFF.

Bendix Drive

ECLIPSE MACHINE DIVISION
Division of Bendix Aviation Corporation
ELMIRA, NEW YORK



MISOL

THE MILLER DIESEL FUEL ADDITIVE

THIS STARTLING NEW DISCOVERY
GIVES YOU CLEAN FUEL SYSTEMS AND
PEAK EFFICIENCY FROM TANK TO
COMBUSTION CHAMBER.

SAFE AND ECONOMICAL

Descriptive Literature and full information on request

MILLER MANUFACTURING CO.
1100-1110 NORTH 32ND STREET CAMDEN, N. J.

Oil Rig Lighting Plants Subject of New Brochure

STEWART & Stevenson Services has just published a colorful four-page brochure on their new Rig Lighting Plants with generating capacities of from 5 to 25 kw.

The brochure contains photographs of the Stewart & Stevenson Rig Lighting Plants, showing the weather resistant sheet metal housing, and how the control panel is the fully enclosed cabinet type, shock-proof mounted to prevent damage to the meters during rough handling. All of the instrument as well as the meters are mounted on this single panel.

Either General Motors Diesels or Continental natural gas, gasoline, or butane engines power these rig lighting plants, and each unit is actually guaranteed to be capable of operating at overloads up to 30% in excess of its rated capacity for intermittent periods.

Descriptions of five Diesel models, and five gas, gasoline or butane models, are included. Copies of this brochure on rig lighting plants may be obtained by writing Stewart & Stevenson Services, with main offices at 4516 Harrisburg Boulevard, Houston, Texas.

New Type Bearing Announced By Mallory

A GRID bearing, which combines good surface properties and good embeddability with high strength and fatigue resistance, has been placed in production by P. R. Mallory & Co., Inc., Indianapolis, Indiana.



The new grid bearing is designed to meet individual customer requirements and is particularly adaptable for use in heavily

loaded applications, such as connecting rod and main bearings in heavy and light Diesel engines and truck engines.

Full details have been published in a Grid Bearing Technical Information Bulletin, available without charge upon request to P. R. Mallory & Co., Inc., Indianapolis 6, Indiana.

Battery Longevity Doubled

ENGINEERS report that the average life of the battery, which has 250 different electrical applications, has been doubled in the last 20 years.

**READ
VISCOSITY
DIRECTLY
AND
CONTINUOUSLY**



The F & P Continuous Viscosimeter constitutes a radical departure from the conventional method of viscosity measurement.

This Viscosimeter is available in simple indicating form, or arranged for continuously recording viscosity values on a 24-hour chart or for controlling fluid viscosity by automatic blending or heating means.

This instrument has proven particularly valuable for continuously blending lube oils, indicating the end points in various chemical processes and in the maintenance of constant fuel oil viscosity for improved oil burner operation. As yet its field of applications is virtually untapped.

Write for catalog Section 88-A

FISCHER & PORTER CO.
DEPT. I-5E HATBORO, PENNA.

**DIESEL
OPERATION
and
MAINTENANCE**

by ORVILLE L. ADAMS, Sr.

**NEW - UP-TO-DATE
— AUTHORITY —**



A practical handbook for everyone concerned with Diesel engine operation and maintenance. This book is a study of operation problems rather than construction details. It discusses basic principles and procedures, identifies the major problems and traces the origins of all practical difficulties. Maintenance, repair and inspection are fully covered. Complete instructions for diagnosing engine difficulties, also fuel, combustion and lubrication faults.

Send for Free Examination Copy - - - \$5.00

Diesel Progress,
2 West 45th Street, New York 19

You may send me, for five days' examination, a copy of Adams' **DIESEL OPERATION AND MAINTENANCE**

At the end of that time I will send you check for \$5 plus 10c postage and packing, or return the book to you.

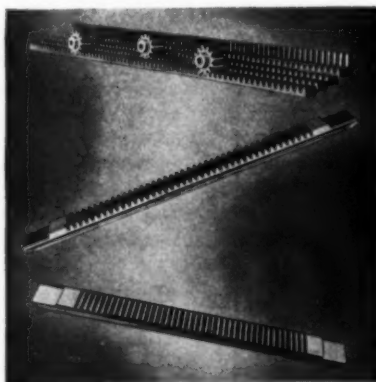
Name
Firm
Address
City Zone State

HERRINGBONE GEARS



CAPACITY Production on *Brad Foote Gears*

Brad Foote Precision Cut Gears — every type — worm and gear — spur — helical — herringbone — bevel — spiral bevel — non-ferrous — made in quantities of any proportion. Write for details and delivery schedules when in need of quantity deliveries to meet your necessary requirements.



RACKS
all sizes
FACE WIDTHS
UP TO
14 INCHES

*Write
for
prices*

BRAD FOOTE GEAR WORKS

1309 South Cicero Avenue
Dept. D, Cicero 50, Ill.

STOP RIGHT HERE-

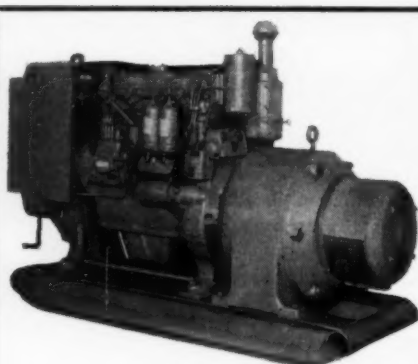
If You're Looking for
Compact Small Pumps
for High Pressure Service



Tuthill Model CK internal-gear rotary pumps are designed to save space and material and give long dependable high-pressure service on machine tools, engines and hydraulic devices. Capacities range from 1 to 50 g. p.m. at pressures up to 400 p.s.i. Direct motor drives, V-belt units and integral drives. You can specify precision-built Tuthill pumps with confidence.

Write for Model CK Bulletin

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25 KW UNIT 1200 RPM

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QUICK DELIVERY
ALL UNITS GUARANTEED
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Illustrated DoALL Production Short Cuts

THE technique of contour machining and its application in metal working shops is clearly demonstrated in a new booklet entitled, "DoALL Equals Ten Plus," now available to shop superintendents, foremen tool and die makers, machinists and students.



"DoALL Equals Ten Plus" is a handy, durable 22-page booklet designed for shopcoat pocket or tool chest, and ready reference on machining operations. It is a pictorial time study of metal fabricating short cuts.

Graphic comparisons show how the productivity and life of more costly machine tools can be increased by relieving them of "hogging" operations that are performed more economically on DoALL Contour Sawing Machines. Shapers, Lathes, Milling Machines, etc., are thereby conserved for their specialized work and precision service.

This booklet of time saving ideas is available free to anyone writing The DoALL Company, 1301 Washington Avenue South, Minneapolis 4, Minnesota. Ask for "DoALL Equals Ten Plus."

National Supply Moves Washington Office

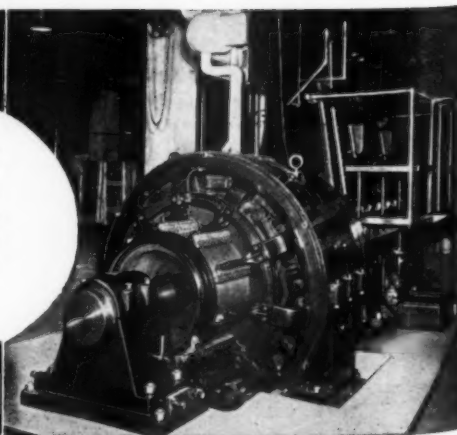
IN order to serve its east-central Diesel engine customers better, the Superior Engine Division of The National Supply Company has moved its branch office from Washington, D. C. to Baltimore, Maryland. J. P. Hill, who had been manager of the Washington office, will continue in charge at Baltimore. The new office in the Tucker Building, 411 South Poca Street, will cover Delaware, Maryland, Virginia and North and South Carolina.

BURKE A-C-D-C GENERATORS

BURKE, not one of the biggest names in generator construction, but certainly one of the oldest, has always been known for quality rather than quantity. Today, with the spur to more power in a hurry, Burke quality goes into 24-hour production lines to provide Diesel Engine users with a husky well-built A. C. or D. C. Generator or Motor to meet any specified conditions up to 1000 K. W. or 1000 H. P. Write for specific information.

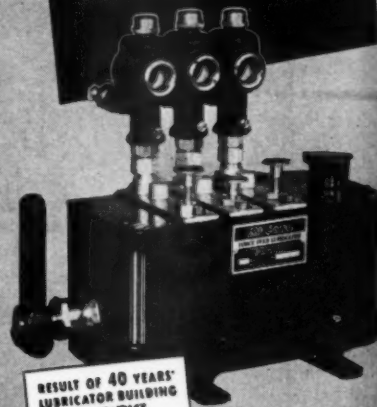
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A modern lubricator for modern service on Diesel, gas, steam engines and compressors. Supplies dependable cylinder lubrication in metered quantities reducing friction and wear. Capacities: 2 to 24 pt. and 1 to 16 feeds. New catalog on request.



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For Better Crankshafts, Consult NATIONAL FORGE

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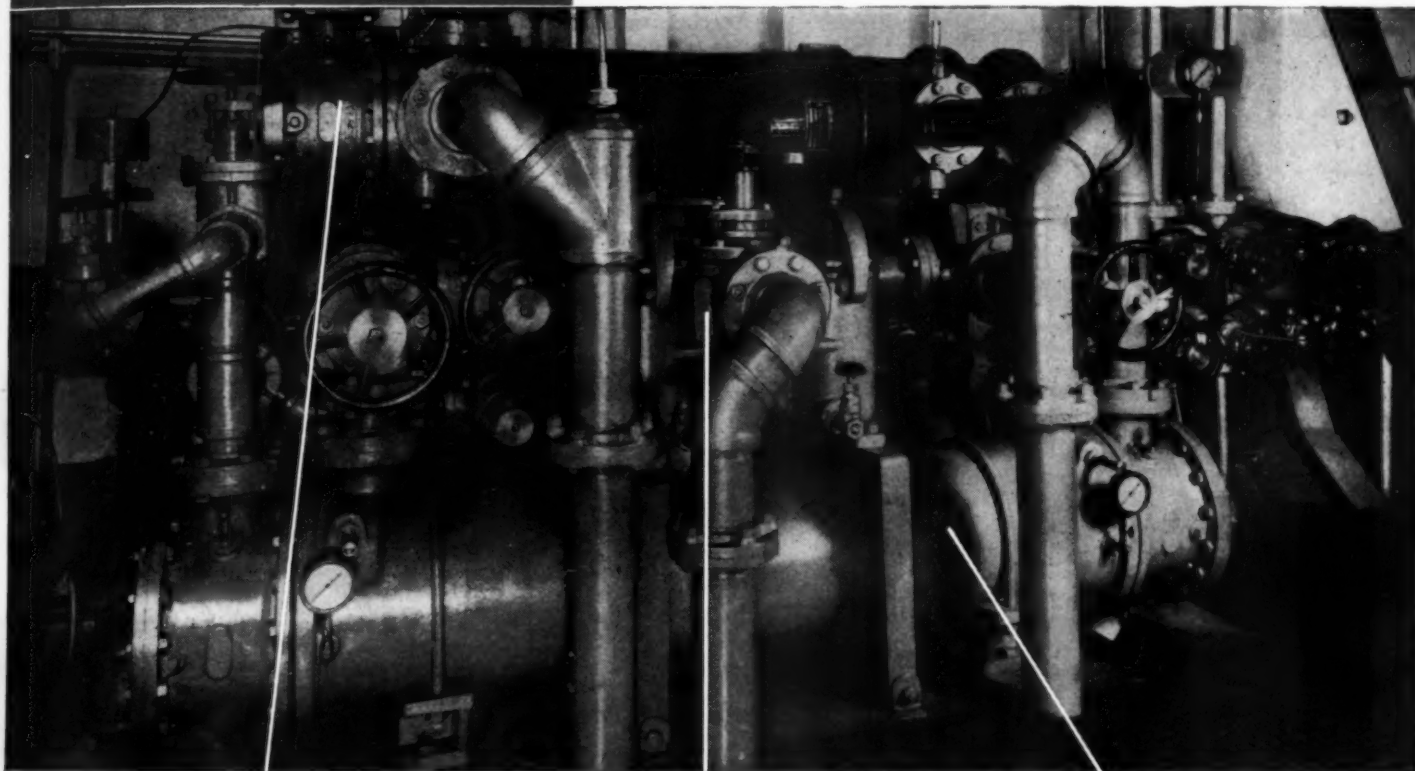


**NATIONAL FORGE
& ORDINANCE CO.**
Irvine, Warren County,
Pennsylvania

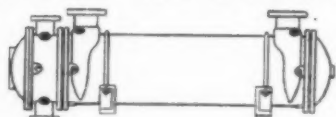
*Minimize
Out-of-Service Time*

....WITH **K** DIESEL AUXILIARIES

Where continuous service is important, the heavy walls, corrosion-resistant materials and rugged design of SK Heat Exchangers and Strainers provide unusually long, trouble-free life and require but little maintenance. Designed specifically to meet the individual requirements of each job, these units have a reputation among users for exceptional performance.

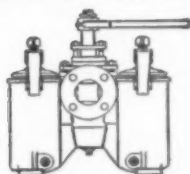


K OIL COOLERS



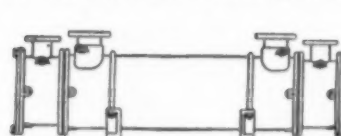
Equipped with a unique packing gland at the floating tube sheet, oil cannot leak to water nor water to oil in these coolers. Baffle rings and discs force liquid into long zig-zag path and a precision-bore fit prevents liquid by-passing between shell and baffle. Easily cleaned without dismantling or disconnecting pipes. Write for Bulletin 12-C.

K DUPLEX STRAINERS



Heavily constructed, these strainers are thorough in removing dirt and other foreign matter from oil or water. Flow is continuous while cleaning the vertical baskets. Single set screw clamps are quickly removable, yet seal basket chambers tightly. Write for Bulletin 9-S.

K WATER COOLERS



Similar to SK Oil Coolers in design, these Water Coolers have exceptionally high heat transfer, low weight and small space requirements. The uniform flow of both jacket and cooling water eliminates strains and cracked cylinders caused by uneven distribution of heat. For complete description, write for Bulletin 12-H.

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CONDENSERS AND VACUUM PUMPS • OIL BURNING EQUIPMENT
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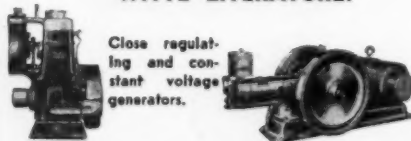
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Engine Sizes	Diesel Electric Plant	
	A.C.	D.C.
4 H.P.	3 KVA	2.5 KW
6 H.P.	5 KVA	4 KW
9 H.P.	7.5 KVA	6 KW
12 H.P.	10 KVA	8 KW

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LARGEST BUILDER OF SMALL DIESELS
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Chas. F. A. Mann Becomes Associate Editor of Diesel Progress

REX W. WADMAN, Editor and Publisher of DIESEL PROGRESS, announces the appointment of Charles F. A. Mann, longtime staff member of DIESEL PROGRESS, as Associate Editor of this magazine. Mr. Mann first became identified with this publication in the first year of its existence, as contributor of a series of Diesel marine feature stories, principally from the Pacific Northwest. He is a native of the State of Washington, and a member of a railroad family with two generations of association among four branches, with the Louisville & Nashville, Great Northern & Northern Pacific. With this inbred love of railroading, Mr. Mann narrowly escaped, on several occasions, being a railroader, but, as he has often said, "Seniority rules on railroads offer little incentive to ambitious and imaginative young men."



Charles F. A. Mann

He began the unique combination of technical journalism and railroad knowledge, inherited and acquired, while attending College of Puget Sound at Tacoma, Washington, in the fall of 1927, with a series of eight feature articles about the Great Northern Railway's \$20,000,000 8-mile New Cascade Tunnel and Electrification, in five of the country's leading national magazines. Leaving college shortly after receipt of his first and most prized check from a publisher, Mr. Mann began a long career writing about railroad and marine subjects for many publications in the U.S.A. and abroad. He has

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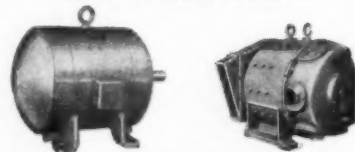
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and GENERATORS



DC and AC* DRIP and SPLASH PROOF
BELT OR DIRECT CONNECTED, ALSO
COMPLETE DIESEL MARINE AUXILIARIES

Write for quotations on Bardco equipment
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made over 50 railroad trips not only across, but completely around the U.S.A. and Canada, has travelled almost 21,000 miles in the cabs of Diesel locomotives, and has written over 1,200 magazine articles and Sunday Supplement feature stories, two-thirds of which were about railroad and marine subjects, in the past 18 years. He entered the Diesel writing picture in 1931, and in the early years of Diesel railroad development, wrote many sensational railroad articles and took trips on every one of the country's first Diesel streamliners in the 1935-1938 Pioneering era.

Mr. Mann will continue to handle Diesel marine and railroad subjects for DIESEL PROGRESS, operating both from New York and the Pacific Northwest, where, oddly, Diesel railroading and Diesel marine activities, enjoy much of their greatest technical development, in a region of tremendous economic importance and almost continuous innovation and pioneering on the vast waterfront and on the 6 great Transcontinental Systems of railroads that serve this region.

Mr. Mann will also study the tremendous new market for Diesel application now taking place in the whole economy of logging and lumbering in the nation's biggest forest products region. Mr. Mann has several important articles about the abrupt change in logging in the big woods from steam to Diesel, and has recently reported: "By 1950 there won't be a piece of steam machinery or a steam logging railroad locomotive anywhere in Oregon, Washington or Idaho—everything will be Diesel."

Rotary Blowers Described in New Roots-Connersville Bulletin

ROOTS-CONNERSVILLE Blower Corp., Connersville, Ind., has just issued Bulletin 22-23-B-12 covering Rotary Positive Blowers, containing 24 pages, including the cover.

The new bulletin covers the many applications for which this type of blower has been found useful and efficient over a long period of years, including the supercharging and scavenging of Diesel engines.

Roots-Connersville Rotary Positive Blowers are built in a wide range of sizes, from 5 to 50,000 cfm., at pressures up to 30 pounds, and for vacuums up to 28 inch Hg.

In addition to numerous installation illustrations, there are characteristic curves, cross-sections, and exploded views to show the operating principle and construction features.



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ERIE'S Connecting Rod Bolts, made from Round Bars, with Hot-Forged Heads, represent the ultimate in craftsmanship and economy to an Engine Builder who must meet present day competition.

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OAKITE SHORT-CUTS

to Diesel cleaning

Clean Filters Faster The Oakite Way

Remember, air-intake filters are Diesel lungs. Periodic cleaning of those filters with Oakite detergents gives them easy breathing. That's because Oakite materials provide the energetic action required to remove clogging deposits. These fast-acting Oakite compounds restore filter efficiency . . . go far toward maintaining trouble-free Diesel operation.

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OAKITE *Specialized* **CLEANING**
MATERIALS - METHODS - SERVICE FOR EVERY CLEANING REQUIREMENT

Atlantic Seamless Flexible Metal Hose

Is highly recommended by leading Diesel Engine Manufacturers, Naval Architects and Engineers for

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Absorbs vibration. Can't leak or burn out. No joints to loosen. No packing to rely on for tightness. In sizes 1" to 36" I.D., inclusive. With forged steel flanges or nipples in lengths desired, straight or bent to your specifications. Atlantic Hose is widely used in Industrial Plants, on Railroads, in Marine service and by the United States Navy.



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YOUR FUEL
SUPPLY
AT A
GLANCE**



THE LIQUIDOMETER CORP.

11th Edition of the Diesel Engine Catalog Just Off the Press

A NEW, completely revised edition of the DIESEL ENGINE CATALOG just came off the press and is now available. This—the first post-war edition of the Catalog reflects sweeping changes in engines and Diesel plant equipment, with many new engine models added. Each engine builder's line is described in detail and illustrated—fuel, lube and cooling systems are traced in color. Over 500 pages packed with valuable information—four sections including the Diesel Engine section, Accessory section, The Market Place—a directory of engines and accessories, and an advertising section. The Catalog embodies the entire Diesel industry under one cover—an indispensable book for design, operating and consulting engineers, sales executives and sales engineers, schools, libraries, in fact for all interested in Diesels. First printing limited so order your copy today. Price \$10.00. Use the convenient order coupon on page 103 of this issue of DIESEL PROGRESS.

Baldwin Issues Anniversary Brochure

"HALF A Century of Diesel Engine Development," a new booklet just published by The Baldwin Locomotive Works tells the story of the Baldwin Diesel engine from the first commercially successful oil engine built in 1893 on down through World War II. That first engine now is on exhibition at the Smithsonian Institute in Washington.

The booklet tells how Baldwin Diesels are built, their use by fifty-four of the country's railroads as well as by private and public utilities, for powering public buildings and industries, ships at sea, and in oil fields and the refrigeration industry. It is a beautifully bound booklet, 10 by 14 inches, in full color, and contains more than one hundred illustrations. Copies can be obtained by writing The Baldwin Locomotive Works, Philadelphia 42, Pennsylvania.

FOR SALE

Immediately available, GMC Model 6-71 Diesel Generator set, 60 K.W., 115 volts D.C., radiator cooled, has run only 200 hours. Switchboard, starting batteries, and pyrometer included. Location—Bayonne, N. J. \$2500. as is, where is.

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JOB WANTED

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Gaskets of all types and materials to give reliable service under all Diesel operating conditions.

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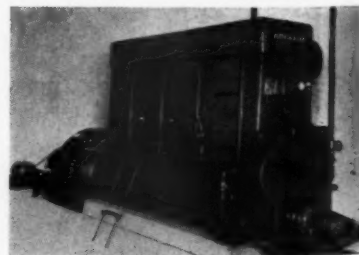
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700 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
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600 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
575 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
550 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
525 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
500 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
475 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
450 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
425 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
400 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
375 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
350 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
325 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
300 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
275 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
250 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
225 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
200 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
175 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
150 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
125 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
100 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
75 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
50 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200
25 HP Buckeye	8 cyl	180 E.V.A.	2.00	2200	1200

Ranking Inquiries by Appointment.

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Power

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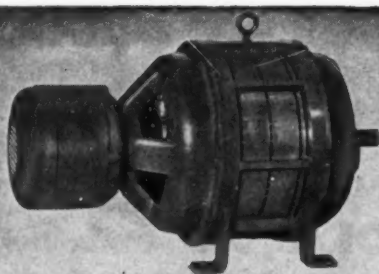
THERE'S NOTHING quite like Purolators for insuring steady, trouble-free operation of Diesels.

Purolator Lube Oil Filters keep damaging abrasives from scoring pistons and bearings. Purolator Fuel Oil Filters guard against dirt and other impurities clogging injector orifices and stopping the engine. In both cases, Purolator protection means less time out for repairs, fewer breakdowns, lower operating costs.

Evidence of the superiority of Purolator protection lies in the fact that there are more Purolators in use on Diesels today than all other makes of filters combined.

Purolator Products, Inc., Newark 2, N. J.
In Canada: Purolator Products (Canada) Ltd., Windsor, Ontario.





Columbia A.C. and D.C. Generators are built to meet highest performance standards. Complete range of application, including light, power, ship auxiliaries, or custom designed units.

D.C. UNITS range from 7 1/2 to 200 KW. A.C. UNITS range from 6 1/4 to 300 KVA. Speeds and other specifications to meet requirements. Write for full information.

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GENERATORS
A.C. and D.C.

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PISTON RINGS
VALVE SEAT INSERTS



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FOR SALE

50 HP Ruston-Hornsby Diesel Electric generating set with Star generator. Puts out 36 KW 220 AC current. This ideal set is complete in every detail. Condition excellent. Has six ton fly-wheel. Just the thing for a garage, service station or small factory. Must sell at once. No reasonable offer refused.

G. H. Hughes, 171 Seventh Street,
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Phone Garden City 9400

Bristol Announces New Bulletin on Tachometers

THE Bristol Company announces a new bulletin, No. S1400, describing its line of Tachometer Recorders and Indicators. The twelve-page bulletin includes a complete description of the Pyromaster potentiometer-type tachometer together with a description of the millivoltmeter-type indicating, and strip-chart recording tachometer. Complete wiring diagrams, application data, and accessory information are given, including illustrations of instruments, magnetos, and a typical illustration. Copies of the bulletin are available from The Bristol Company, Waterbury 91, Connecticut.

Robert H. Owens Elected Vice-President of Roots-Connorsville Blower Corp.

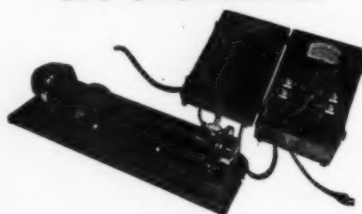
ROBERT H. OWENS was recently elected Vice President in charge of Engineering and Manufacturing of Roots-Connorsville Blower Corp., Connorsville, Indiana, one of the Dresser Industries.

An engineering graduate of Purdue University, Owens has been active in engineering and research since 1912. He joined the engineering staff of Roots-Connorsville in 1925, and since that time has been responsible for many new centrifugal blower and compressor developments.

New Burmeister and Wain Office Opens in New York

POUL A. CHRISTENSEN, consultant for Burmeister and Wain of Copenhagen, Denmark, opened a new office in New York on September 1st. The new office will be located at 34 West 53rd Street, New York, N. Y.

Photoelectric CRC SMOKEMETER



Objective indication of smoke density, independently of human judgment and of light conditions.

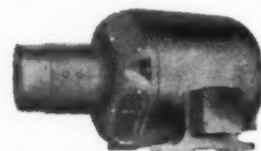
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A. C. CURRENT ANYWHERE

A.C. generators provide the same kind of current as the highlines. Available in sizes 500 watts through 125 K.W. in all standard voltages and frequencies.



GOOD DELIVERY ON DIRECT CURRENT MOTORS

Good delivery on 1/4, 1/3 and 1/2 HP, D.C. motors. All steel construction, high efficiency, suitable for vertical or horizontal mounting.

Manufacturers of A.C. and D.C. generators, special A.C. motors, rotary converters, motor-generators, frequency changers, gas engine driven power plants and battery chargers.

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The Experience Resulting
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Exclusively to the Design
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Both Plain Mechanical
and Hydraulic Types of
Governors
Is Available When You
**SPECIFY
PICKERING
FOR YOUR ENGINES**

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Dee Dee Cee HYDRAULIC DIESEL INDICATOR

This NEW scientifically designed instrument will meet requirements for instantaneous reading of peak firing and compression pressure. It quickly indicates improper pressures due to defective injectors, faulty fuel pumps, leaky valves, or piston blow-by.



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WANTED

Experienced layout man by manufacturer of high speed Diesel engines. Must be capable of making fast and accurate layouts of engine components and assemblies—also assemblies of engines with associated equipment such as AC and DC generators, oil field power rigs, marine drives, etc. State full qualifications in first letter. Box 143, DIESEL PROGRESS, 2 West 45 St., New York City.

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(Minimum Maintenance)

Sheppard

(Simplified Operation)

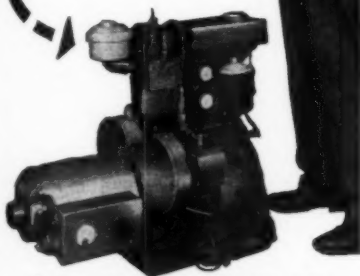
Diesel

(Maximum Economy)

Generating Set

(For Night Operations or Standby Power)

This smallest of Diesel-powered generating sets is always ready to produce low-cost lighting or auxiliary power—from the moment it's out of the crate. It requires very little maintenance because the 2,000 watt generator is driven by an air-cooled 3½ H.P. Sheppard Diesel. Write for more interesting facts about the only air-cooled diesel-powered generating set available.



R. H. SHEPPARD COMPANY, INC.
16 Middle Street, Hanover, Pa.

DIESEL'S THE POWER. *Sheppard's* THE DIESEL

Marion Presents New Diesel Shovel

MARION Power Shovel Company of Marion, Ohio, announced recently a new 3½-4 cubic yard machine for heavy duty service in mining, quarrying, stripping and general construction. The 111-M fills a long-felt need for a Diesel powered machine in this size which can be readily shipped without major dismantling and which is also quickly convertible to dragline or clamshell service.

It is of all welded construction with a balance in design providing for low center of gravity, making the machine stable under all digging conditions. Particular care has been given to the requirements in heavy duty service for speed, power, ease of control and maneuverability.

The Diesel power plant, in combination with Marion air control with fully-compensating type valves, places heavy-duty power at the disposal of the operator with a minimum of tiring physical exertion on his part. Control lever pressure is held to approximately 12 lbs. maximum. The fully-compensating type valves give the operator the constant "feel" of the load and enable him to apply or withdraw power gradually or quickly.

New ALCO Diesel Locomotive

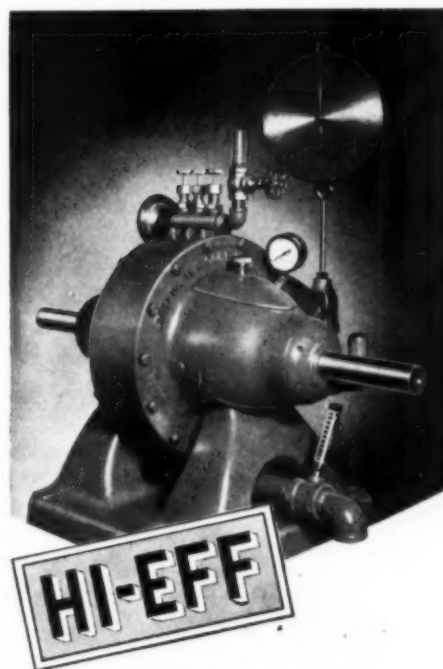
TESTS on a new two-unit 4000 horsepower Alco-GE Diesel-electric locomotive were completed recently on the Lehigh Valley Railroad. For thirty days the new locomotive was used on Lehigh Valley's fast passenger runs between Buffalo, N. Y., and Newark, N. J. During the entire test period, technicians and engineers of American Locomotive and the General Electric Company rode in the locomotive to check operations.

Results of the tests have not been announced, but it was said that no "helper" engine was required on the runs over the Wilkes-Barre Mountain in Pennsylvania. This is contrary to the historic procedure on the Lehigh Valley.

On westbound runs the new engine was used on Lehigh's Black Diamond schedule and in the eastbound tests the locomotive pulled the Maple Leaf.

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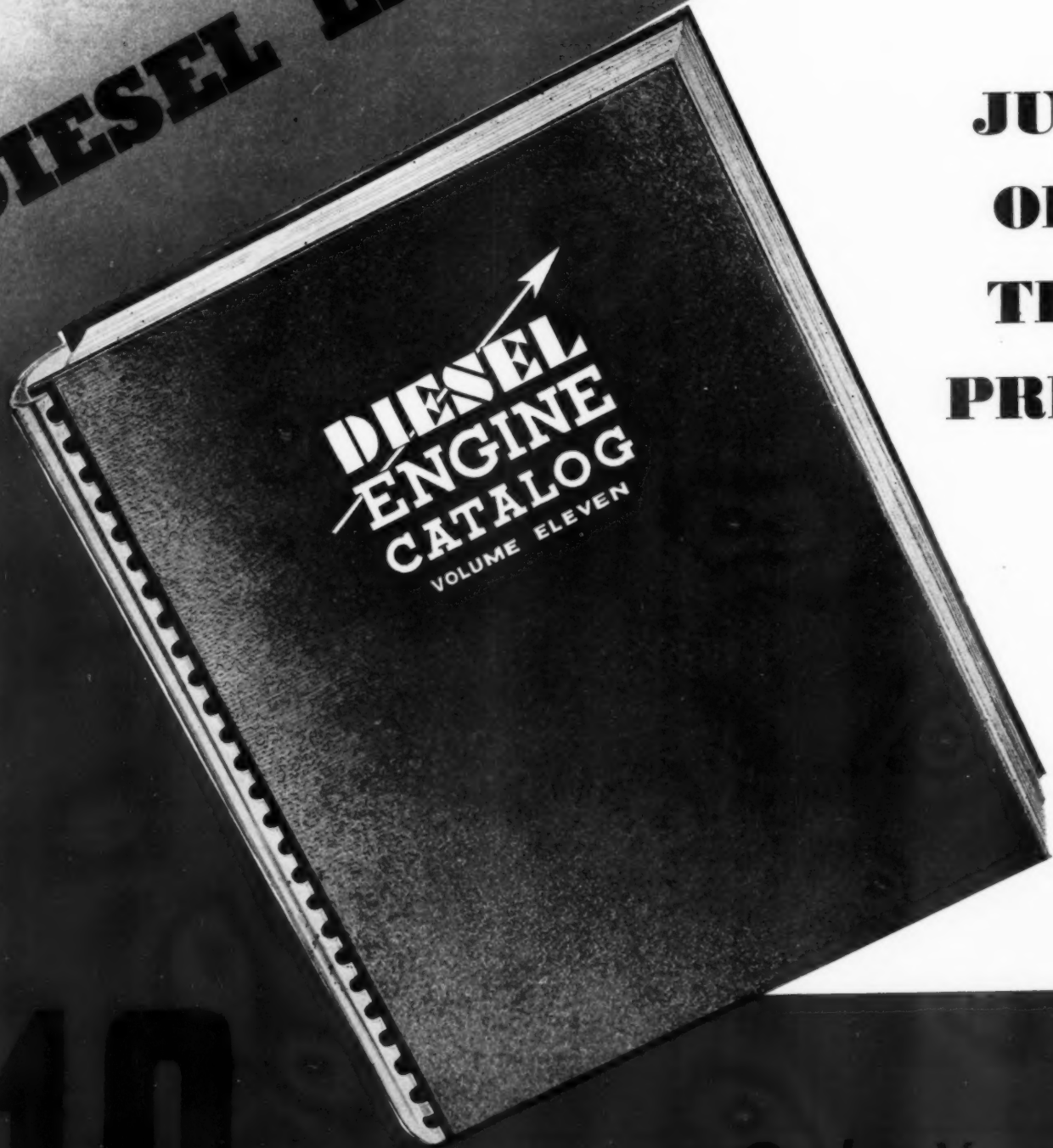
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There is a Market Place Section—a directory of Diesel engines classified as to ratings and speeds with manufacturers' names and addresses — and a Product Directory including accessories, parts, materials and services — all classified as to products. The Market Place tells you at a glance where to find what you want for your engine or plant.

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3. The Market Place — a classified directory of Diesel Engines and Accessories.
4. Manufacturers' Advertisements—140 pages of Catalog-type copy—informative—helpful.

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Atlas Imperial Diesel Engine Company
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Chicago Pneumatic Tool Company
Chrysler Motor Company (Dodge Division)
Clark Brothers Company
Consolidated Diesel Electric Corporation
Climax Engineering Company
Continental Motors Corporation
Cooper-Bessemer Corporation
Cummins Engine Company
Enterprise Engine & Foundry Company
Fairbanks, Morse & Co.
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• Responsible party is looking for a new item applicable to the diesel field or an old product that has not been promoted nationally. Must be patented or patentable. Will buy outright or act as manufacturers' agent for you. Please give full details in first letter. Address Box 165 Diesel Progress, 2 W. 45 St., New York City.

Eaton Manufacturing Company Releases Product Bulletin

A CONCISE bulletin describing the products of the Eaton Manufacturing Company has recently been released. It contains one page summaries of the various Eaton products which include engine valves, valve seat inserts, tappets, hydraulic pumps, coil and leaf springs, and washers.

The newest developments by Eaton are included in this bulletin and include a thermo electric generator which utilizes a kerosene flame to generate electricity, and a dynamatic induction drive which when used automotively will automatically hold accessory drives at their most efficient speeds, rather than having them vary with the engine speed.

Grand Junction, Iowa Buys a New Diesel

THE citizens of Grand Junction, Iowa, have purchased a new Diesel, a 400 hp. Atlas Imperial, for their 14 year old municipal plant.

The original plant was built in 1932 at a cost of \$90,000 and has been successfully operated with the result that the original bonds issued to cover the cost of plant construction have been paid and a comfortable surplus accumulated.

The original plant contained two 240 hp. Diesels which now have been amplified by the new 400 hp. Atlas. The new 275 kw. generator was supplied by the Electric Machinery Company. All installation work including pumps, piping and incidental material is being done by the Atlas Company. This includes a modern forced draft cooling tower.

The total cost of the improvement which includes the enlargement of the building, and an installation of a modern street lighting system, as well as the new Diesel generator set, will be approximately \$79,000.



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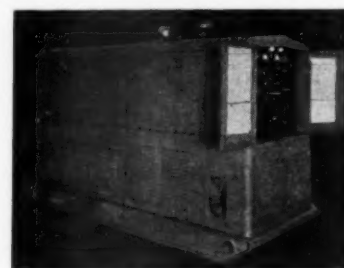
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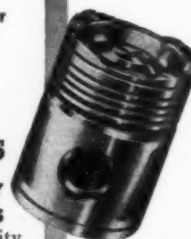
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New U. S. Pressure Gauge

THE United States Gauge Division of American Machine and Metals, Inc., announces the introduction of the newly designed Super-gauge.

This instrument embodies the most advanced engineering technique for a heavy duty type pressure gauge suitable for the most severe industrial service. The internal parts are made of high grade non-corrosive metals. The working elements are designed to withstand repeated pulsation and vibration as well as abnormally high overpressures.

Supergauges are made in pressures ranging from 30 pounds per square inch up to 10,000 pounds per square inch and come in 4½ inch, 6 inch and 8½ inch dial sizes. They are used on boilers, Diesel engines, hydraulic equipment,

compressors, pumps and applications where accurate process control and safety is demanded.

390,000 Motor Boats Now On Federal Waters

NUMBERED motor boats on the federal waters of the United States and its possessions totaled 390,462 as of February, 1946, according to figures recently issued by the U. S. Coast Guard. This represents a gain of more than 13,000 craft since the height of the war, there being 377,132 numbered motor boats listed at the end of 1944.

In the current tabulation, the two mid-west districts of Cleveland and St. Louis show a total of 133,037 numbered boats. The New York District is third with a total of 44,628, leading all coastal districts, either on the Atlantic or Pacific.

Borg-Warner Announcements


AS part of a postwar expansion program, C. S. Davis, president of Borg-Warner, announced recently the promotion of two top officials and plans for expanding production of the Morse Chain Company of Ithaca, N. Y., and Detroit, Mich., a B-W subsidiary.

In the program, Frank M. Hawley was elevated to the presidency of the subsidiary from his present capacity of vice-president and continues as general manager, and Ray P. Johnson was named first vice-president and assistant general manager of the Morse Company.

At the same time, Mr. Davis made known that the demand for the Morse company's products had more than justified the original expansion program and that additional planning for increasing facilities and production is indicated.

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*Pronounced—Hoo-dye.

WEST COAST DIESEL NEWS

By FRED M. BURT

POWERED by a 600 hp. Fairbanks-Morse Diesel with two 225 hp. F-M plants driving 140 kw. generators, the 124 ft. wooden, fantail tuna clipper *Madierense* has been returned to its San Diego owners by the Navy, and has been reconverted at the Harbor Boat Bldg. Co., Terminal Island.

MISS AMERICA, new wooden tuna clipper 101 ft. x 25 ft., built by Hodgson-Greene-Halde-

man of Long Beach, for Sebastian D. Silva and associates, San Diego, designed by Arthur De-Fever, is propelled by a 400 hp. supercharged Enterprise Diesel. Auxiliaries are three 65 hp. Caterpillar Diesels, direct connected to 30 kw. Fairbanks-Morse generators.

THE Alaska Packers Ass'n received a new power scow *Sea Lion*, 86 ft. x 29 ft. from Maritime Shipyards, Seattle. She is powered by twin 115 hp. Caterpillar Diesels equipped by Petrich Machine Wks. with Sol-E-Naud electric clutch

controls, manufactured by Kirsten Pipe Co.

THE combination salmon troller and tuna boat *Beticia*, built for M. N. Ostey, Seattle, by Lester & Franck Boat Co., designed by Edwin Monk, is powered with a 164 hp. General Motors Diesel, installed by Evans Engine & Equipment Co.

THE new 60 ft. steel trawler, *Santa Rosa*, built by United Concrete Pipe Corp., Long Beach, as a deck equipment feature, has trawling machinery recently developed by Shepherd Diesel Marine, Los Angeles. The vessel is driven by a 130 hp. Superior Diesel, with a 30 hp. General Motors Diesel as auxiliary.

A NEW oil conditioner announced by Winslow Engineering Co., Oakland, intended for Diesel engines from 150 to 250 hp., is so designed that the oil cannot drain back into the crankcase when the engine is idle; thus providing that the filter will always be full when the engine is started, with no chance for crankcase flooding.

THE second National Marine Exposition will be held in San Francisco's Civic Auditorium, May 12-17, 1947. The success of the first exposition held in Grand Central Palace, New York, May 20-25, was evidenced by the fact that 16 prominent exhibitors signed up for 29 exhibit spaces for 1947.

DELIVERING 470 tons of tuna, just four tons short of a one-trip record, the *White Star*, a \$450,000 tuna clipper with a 1200 hp. Enterprise Diesel, cruised all the way to the equator for the Van Camp Sea Food Co., with no trouble, according to skipper Johnny Tasso.

THE *Cesare Augusto*, 80 ft. purse seiner, owned by John Zuanich, with Larry Zuanich as skipper, built in 1937, has been re-powered with a 240 hp. Washington Diesel.

THE *Santa Barbara*, the fourth of a series of identical 131 ft. tuna clippers designed by G. Bruce Newby, and built in Long Beach by United Concrete Pipe Corp., has for its main engine a 7-cyl. 14 in. x 17 in. Fairbanks-Morse, direct-reversing Diesel developing 805 hp. at 300 rpm. Auxiliaries are two 6-cyl. Atlas Imperial Diesels developing 225 hp. at 514 rpm., direct-connected to Fairbanks-Morse 156 kva. generators.

A NEW transpacific shipping organization, the Pacific Orient Express Line will maintain a monthly freight service from the West Coast and Canada to Japan and North China, using

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GLOBE-UNION INC. Milwaukee 1, Wisconsin

three modern 9000 ton motorships of 14 knots speed. The *Vito* built in 1937 and the *Vignes* and *Vilja* built in 1945.

THE 99 ft. steel tuna clipper *Lou Jean*, fishing for Sun Harbor Packing Co., San Diego, and built by Consolidated Steel Corp., Long Beach, is powered by a 600 hp. Enterprise Diesel, with twin 155 hp. Caterpillar Diesel auxiliaries.

THE *Karen A*, *Betty A*, and *Teddy J*, 45 ft. combination trollers recently completed by Tacoma Boat Building Co. for Stener Anderson, Clarence Anderson and Theodor Jacobson respectively, are powered with 65 hp. Caterpillar Diesels, and are three of ten similar boats that have been built.

THE ex-submarine escort *YP-131* has been returned to Hodgson-Green-Haldeman and modernized at a cost of \$75,000 into the luxury yacht, *Sobre Los Olas* ("Over the Waves"). The drive is by a pair of 120 hp., 6-cyl. Atlas Imperial Diesels handled for throttle by Adel hydraulic controls on each engine. The auxiliary is a 25 hp. 2-cyl. Caterpillar Diesel.

THE 43 ft. San Francisco Bay tug *Marin*, a 40-year-old veteran, has been overhauled at Nunes Bros., Sausalito and re-powered with a new 150 hp. Murphy Diesel purchased from Oswald's Machine Works, San Francisco. Electrical installations by Ets-Hokin & Galvan.

A 40 ft. welded steel, V-bottom combination fishing boat has been designed by naval architect H. C. Hanson, Seattle, for Forrest W. Hall, Charleston, Oregon, who will build her as well as fish with her. It will be powered with a 110 hp. 4-cyl. Gray Diesel engine equipped with 3-to-1 reduction gear.

THIRTY-FIVE fishing vessels will be built in the Puget Sound area under the UNRRA program to go to China. Bids for these 75 to 85 ft. vessels were opened by the Treasury Dept. Procurement Division. They will be powered by heavy duty, full Diesel engines developing from 180 to 250 hp. at not over 450 rpm. About 35 Pacific Coast fishing boats have been outfitted for such work and will travel in convoys, unaccompanied by larger ships, by the southern route to Shanghai.

DELIVERY of the S. S. *Golden Light*, 460 ft. 2 built as cargo vessel, with three sister ships, to be converted into luxurious passenger liners, marks the completion of Consolidated Steel Corporation's shipbuilding program which included many Diesel-powered units. 200 ships

were delivered to the Navy and Maritime Commission; 1298 vessels were launched and delivered from all its operations. Delivered to the Agwilines, these four ships will operate from New York to Puerto Rico and Mexico with cargo space of 300,000 cu. ft. dry cargo, and 160,000 cu. ft. refrigerated cargo space.

SIXTY-FIVE powerhouse plants for the U.S. S.R. with air-starting, radiator-cooled, Venn-Severin, V-type, 6-cyl. supercharged Diesel engines of 165 hp. at 750 rpm., are being equipped in Los Angeles by Bardco Sales & Mfg. Co.

with Bardco 100 kw. generators, Pickering hydraulic governors and American-Bosch injectors, and complete with control panels.

THE new "Highway Train," purchased by Santa Fe Trailways from the builder, Henry Kaiser's Permanente Metals Corp. is a 60 ft. aluminum-magnesium articulated bus. It is powered with a 275 hp. pancake Cummins Diesel engine, specially built for this use. With Pullman car type furnishings, swivel chairs, seat lights, lavatories, the first of these 40-passenger coaches cost \$150,000.

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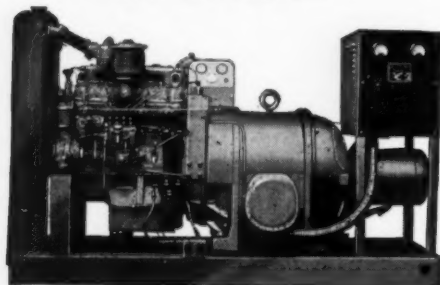
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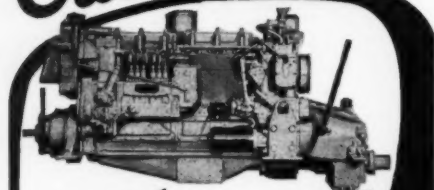
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